

**UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES**

**(Pre-Decisional)
ENVIRONMENTAL ASSESSMENT**

for the

Management of Vulture Damage in the Commonwealth of Virginia

Prepared by:

**UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES**

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SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) proposes to continue the current black and turkey vulture (Coragyps atratus and Cathartes aura) damage management program in the Commonwealth of Virginia. WS would provide technical assistance and would disperse or remove vultures to alleviate damage to livestock, pets, property, human health and safety, and agricultural resources. Vulture damage management would be conducted on private and public land in Virginia when the resource owner (property owner) or manager requests assistance. Black vulture damage in Virginia primarily includes predation on livestock and pets and damage to property. Congregations of both black and turkey vultures are associated with health concerns, property damage, and nuisance complaints, primarily in urban/suburban areas. Turkey vultures are identified as causing damage less often than black vultures or mixed flocks. Turkey vulture damage usually is associated with roosts in urban/suburban areas.

Under the proposed action, WS would provide technical assistance which includes: instructional sessions, technical and biological information about vultures, information about harassment and husbandry, loaning of scare equipment, selling or distributing harassment tools to property owners and managers, and lethal damage management methods (e.g. migratory bird depredation permits). WS would assist property owners and managers with the migratory bird depredation permit process to obtain permits to legally take vultures to reinforce harassment programs. WS would conduct direct damage management assistance with non-lethal and lethal methods. Non-lethal methods used by WS would include the use of pyrotechnics, lasers, electronic harassment, tactile repellents, mechanical repellents (e.g., coil wire, porcupine wire), modified electric fencing on buildings, effigies and taxidermic effigies, and habitat alteration. Lethal methods used by WS would include shooting and live capture followed by euthanasia. WS recommends and utilizes an Integrated Wildlife Damage Management (IWDM) approach to manage wildlife conflicts. Where property owners or managers would have already adopted a vulture management plan that encompasses such an integrated approach, and the WS action would be to assist with the implementation of the integrated wildlife damage management program. Lethal vulture removal would be conducted by WS in situations where non-lethal damage management methods such as harassment, husbandry, and habitat alteration were not appropriate, were ineffective, or were inadequate to achieve vulture damage management goals when used alone.

ACRONYMS

APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
CCC	Cultural Carrying Capacity
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
IWDM	Integrated Wildlife Damage Management
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
USGS	United States Geological Survey
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S.D.I, Fish and Wildlife Service
VAC	Virginia Annotated Code
VDACS	Virginia Department of Agriculture and Consumer Services
VDM	Vulture Damage Management
VDGIF	Virginia Department of Game and Inland Fisheries
WS	Wildlife Services

1.0 CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.1 Introduction

The United States Department of Agriculture (USDA) is authorized and directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services (WS) program is The Act of March 2, 1931, as amended (7 U.S. C. 426-426c; 46 Stat. 1468); the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988 (P.L. 100-202); and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001. WS activities are conducted in cooperation with other federal, state and local agencies; and private organizations and individuals. Federal agencies, including the United States Department of Interior, Fish and Wildlife Service (FWS), recognize the expertise of WS to address wildlife damage issues related to migratory birds.

Wildlife damage management, or control, is defined as the alleviation of damage or other problems caused by or related to the presence of wildlife. It is an integral component of wildlife management (Leopold 1933, The Wildlife Society 1990, Berryman 1991). The WS program uses an Integrated Wildlife Damage Management (IWDM) approach (sometimes referred to as Integrated Pest Management or IPM) in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1, 1-7 of The Animal Damage Control Program Final Environmental Impact Statement (USDA 1997). These methods include the alteration of cultural practices as well as habitat and behavioral modification to prevent damage. The control of wildlife damage may also require that the offending animal(s) be removed or that populations of the offending species be reduced through lethal methods.

WS's mission is to "provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and to safeguard public health and safety." This is accomplished through:

- A) training of wildlife damage management professionals;
- B) development and improvement of strategies to reduce economic losses and threats to humans from wildlife;
- C) collection, evaluation, and dissemination of management information;
- D) cooperative wildlife damage management programs;
- E) informing and educating the public on how to reduce wildlife damage and;
- F) providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1989).

This Environmental Assessment (EA) evaluates ways by which this responsibility can be carried out to resolve conflicts with vultures in the Commonwealth of Virginia.

WS is a cooperatively funded and service oriented program. Before any operational wildlife damage management is conducted, *Agreements for Control* or *WS Work Plans* must be completed by WS and the land owner/administrator. WS cooperates with private property owners and managers and with appropriate public land and wildlife management agencies, as requested, with the goal of effectively and efficiently resolving wildlife damage problems in compliance with all applicable federal, state, and local laws.

Individual actions on the types of sites encompassed by this analysis may be categorically excluded under the APHIS Implementing Regulations for compliance with the National Environmental Policy Act (NEPA) (7 CFR 372.5(c)). APHIS Implementing Regulations also provide that all technical assistance furnished by WS is categorically excluded (7 CFR 372.5(c)) (60 Federal Register 6,000 - 6,003 (1995)).

WS has decided to prepare this EA to assist in planning vulture damage management (VDM) activities and to clearly communicate with the public the analysis of cumulative impacts for a number of issues of concern in relation to alternative means of meeting needs for such management in the State. This analysis covers WS's plans for current and future VDM actions wherever they might be requested within the Commonwealth of Virginia.

Biological carrying capacity is the land or habitat's limit for supporting healthy populations of wildlife without degradation to the animals' health or their environment over an extended period of time (Decker and Purdy 1988). Wildlife acceptance capacity, or cultural carrying capacity, is the limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations (Decker and Purdy 1988). These terms are especially important in urban areas because they define the sensitivity of a local community to a specific wildlife species. For any given damage situation, there will be varying thresholds by those directly and indirectly affected by the damage. This threshold of damage is a primary limiting factor in determining the wildlife acceptance capacity. While the Commonwealth of Virginia has a biological carrying capacity to support more than the current number of black vultures (*Coragyps atratus*), the wildlife acceptance capacity is often much lower. The Commonwealth of Virginia may be approaching the biological carrying capacity to support the current number of turkey vultures as indicated by a slower rate of growth compared to black vultures. However, the wildlife acceptance capacity for turkey vultures (*Cathartes aura*) is often much lower in some situations than the biological carrying capacity. Once the wildlife acceptance capacity is met or exceeded, people will begin to implement population or damage reduction methods, including lethal management methods, to alleviate property damage and public health or safety threats (Loker et al. 1999).

This environmental assessment (EA) documents the analysis of the potential environmental effects of the proposed program. This analysis relies mainly on existing data contained in published documents, primarily the Animal Damage Control Final Environmental Impact Statement (USDA 1997) to which this EA is tiered. These WS activities will be undertaken in compliance with relevant laws, regulations, policies, orders, and procedures including the Endangered Species Act.

A Notice of Availability of the environmental assessment (pre-decisional) will be published consistent with APHIS NEPA procedures to allow interested parties the opportunity to obtain and review the document and comment on the proposed management activities.

1.2 Purpose

The purpose of this EA is to analyze the effects of WS activities in Virginia to manage damage caused by the turkey vulture and black vulture. Resources protected by such activities include property, livestock, pets, human health and safety, and agricultural resources.

1.3 Need For Action

Conflicts between humans and wildlife are common in Virginia. The WS program in Virginia received approximately 3,997 requests for wildlife damage management assistance from the public during federal fiscal years 1997 through 2001 (October 1996 - September 2001). Requests for assistance with vulture damage were the second most common request for assistance over the last 10 years (Table 1-1; MIS, Annual Tables 1992 - 2001). There were 635 requests for assistance with vulture damage in Virginia from federal fiscal year 1997 through 2001 (Table 1-1).

1.3.1 Summary of Proposed Action

The proposed action is for the WS program in the Commonwealth of Virginia to continue the current Integrated Wildlife Damage Management (IWDM) program that responds to requests for VDM to protect property, livestock, pets, human health and safety, and agricultural resources in the Commonwealth of Virginia (Table 1-2). An IWDM approach would be implemented which would allow use of any legal technique or method, used singly or in combination, to meet requestor needs for resolving conflicts with black or turkey vultures (Appendix B). Cooperators requesting assistance would be provided with information regarding the use of effective nonlethal and lethal techniques. Lethal methods used by WS would include shooting and live trapping followed by euthanasia. Nonlethal methods used by WS may include habitat alteration, husbandry practices, wire barriers and deterrents, tactile repellents, effigies, and harassment and scaring devices. In many situations, the implementation of nonlethal methods such as habitat alteration, husbandry practices, harassment, and mechanical repellents would be the responsibility of the requestor to implement. VDM by WS would be allowed in the State, when requested, on private property sites or public facilities where a need has been documented, upon completion of an *Agreement for Control*. All management actions would comply with appropriate federal, state, and local laws.

1.3.2 Need for Vulture Damage Management to Protect Property Resources

Vultures damage a variety of property resources. Some of the property resources damaged by vultures include buildings, vehicles, ornamental trees, pets, and loss of use of the property.

1.3.2.1 Damage to buildings and property

Property damage from black vultures has included tearing and consuming latex window caulking or rubber gaskets sealing window panes, and rubber roof linings, asphalt and cedar roof singles, vinyl seat covers from boats, tractors, and cars, and plastic flowers at cemeteries (Table 1-2, Lowney 1999). Black vultures have also torn pool covers, floats used in pools, hot tub covers, and grill covers, and pulled clothes from clothes lines (Table 1-2). Black vultures also damage vehicles by loafing on the cars and trucks resulting in their claws scratching the paint (Table 1-2). They also tear and strip wiper blades from vehicles parked in parking lots (Table 1-2). Black vultures have picked the eyes and torn the bodies on 3-D archery targets and torn swimming aides used by children. Also, large ornamental trees around homes have been killed, injured, or deformed from large numbers of black and turkey vultures roosting in these trees (Table 1-2, Lowney 1999). Accumulation of vulture droppings can cause arcing and power outages at electrical transmission towers that vultures use as roosting and perching sites (Table 1-2, Lowney 1999). Property damage from mixed flocks of black and turkey vultures in Virginia was usually reported as breaking or tearing roof shingles and pulling rubber gaskets sealing window panes (Table 1-2, Lowney 1999). However, while both species were reported present when damage occurred, it appeared that black vultures caused most property damage and posed the most threat to pets (Table 1-2, Lowney 1999).

1.3.2.2 Harm to pets

Lowney (1999) reported that predation on pets, primarily dogs and cats, was not well documented. Pets that were restrained by short leashes near black vulture roosts appeared vulnerable to attack. Also, pets placed in small pens with no building which they could retreat into were vulnerable to black vulture attack. Free-ranging cats were reported to hide in shrubbery when black vultures approached and then froze when cornered or circled, allowing the black vultures to attack with their beaks.

Vultures consume dead animals, some of which were killed by botulism (*Clostridium botulinum*)

(Kalmbach 1939, Ohishi et al. 1979). The toxicity of botulism varies among mammal and bird species (Kalmbach 1939) and is fatal to most animals and man. Botulism toxins are some of the most deadly neurotoxins known to man and animals, causing death by respiratory paralysis (Ohishi et al. 1979). However, the amount of toxin necessary to cause death is lower than that needed to elicit an antibody response; therefore death may occur before protection can be established (Ohishi et al. 1979). Vultures are highly resistant to botulism (Kalmbach 1939, Ohishi et al. 1979).

Pets, especially dogs, are vulnerable to dying or requiring veterinary care if they consume vulture vomit. The vomit of vultures may contain the bacteria Clostridium botulinum which can be fatal to dogs. Some dogs were reported by veterinarians to have died or got sick from botulism and some owners reported the dogs became sick after eating vulture vomit (WS, unpublished data).

The bacteria Staphylococcus aureus and Pseudomonas aeruginosa are found in the crop and stomach of black vultures (Schlatter et al. 1978). Most bacteria is destroyed in the vulture's stomach, except those that sporulate or are highly resistant. The bacteria Escherichia coli, a bacteria apparently resistant to the vulture's stomach acid, is found in the cloaca of vultures (Schlatter et al. 1978). *E. coli* would be found in vulture fecal droppings if it occurred in the cloaca. While Schlatter et al. (1978) believe vultures are a possible disseminator of pathogenic agents. They also believe vultures eliminate some potential infectious sources by consuming dead infected animals. Pets may be exposed to these bacteria by eating vomit or by grooming after passing through a roost.

There appears to be a low risk of harm to pets (dogs) from vulture roosts unless they consume vulture vomit. Vultures may vomit when startled, threatened, or attacked by people, other animals, or other vultures. Dogs are likely to encounter vulture vomit in or adjacent to roost sites. Pathogens other than Clostridium spp. may occur in vulture vomit which dogs may eat. Dogs and pets may come into contact with fecal pathogens by traveling through roost sites. These pathogens may enter their bodies by grooming.

1.3.3 Damage and conflicts associated with roosts

Vulture damage associated with roosts was reported in 58 cities and towns across Virginia from 1997 through 2001 (Table 1-3). The size of the roosts associated with property damage or health concerns varied from 20 to 900 vultures where WS provided assistance from 1997 through 2001. There were an average of 239 vultures among 55 roosts where WS provided assistance from 1997 through 2001. The size of roosts may be larger or smaller at locations where WS did not provide assistance.

Vulture damage in urban/suburban areas is usually associated with roosts. Damage is often reported as property damage, loss of use, and/or human health concerns. Some landowners have concerns for the health or safety of children or pets. Landowners are concerned about the accumulation of fecal droppings on their property and natural and ornamental vegetation. Some landowners had concerns about vomit on their properties or homes. A few landowners were concerned about the declining assessed value of their homes due to a roost on the property or in the subdivision. Local government's have reduced the assessed value of property due to vulture roosts (West 1998, Milgrim 2000). Many landowners have concerns about the overpowering ammonia odor which emanates from large vulture roosts due to the accumulation of fecal droppings. Many landowners find the white-wash affect of fecal droppings on their home, lawn furniture, out buildings, and property aesthetically unappealing. Some landowners are upset about the damage to and death of large ornamental trees due to vultures breaking limbs from roosting and the accumulation of acidic fecal droppings on the soil. Some landowners complain about being unable to use their property due to a combination of several types of damage.

1.3.4 Need for Vulture Damage Management to Protect Livestock

1.3.4.1 Predation by vultures

Black vultures predation on livestock in Virginia was reported to WS from 1997 through 2001

Table 1-1. Number of requests for technical assistance for wildlife damage received by Wildlife Services of the United States Department of Agriculture, Animal and Plant Health Inspection Service in Virginia from federal fiscal year 1992 through 2001. Only the number of requests for the twelve most frequently reported wildlife species are shown.

<u>Species</u>	<u>FY2001</u>	<u>FY2000</u>	<u>FY1999</u>	<u>FY1998</u>	<u>FY1997</u>	<u>FY1996</u>	<u>FY1995</u>	<u>FY1994</u>	<u>FY1993</u>	<u>FY1992</u>	<u>TOTAL</u>	<u>RANK</u>
Canada geese	213	209	265	205	198	142	60	102	75	46	1515	1
Vultures	174	128	113	116	104	80	129	65	38	40	987	2
Coyotes	148	114	131	74	72	79	15	64	34	62	793	3
Beavers	286	36	70	115	22	15	19	33	14	14	624	4
Blackbirds/starlings	27	24	28	33	26	19	28	25	23	16	249	5
Pigeons	23	11	25	18	24	27	28	25	24	20	225	6
Ducks (mostly feral)	24	28	14	18	41	40	8	16	18	11	218	7
Woodpeckers	18	6	14	11	16	15	25	35	22	37	199	8
Gulls	6	21	14	18	14	28	14	31	18	4	168	9
Hawks	25	21	16	11	8	15	8	17	12	21	154	10
Crows	20	23	14	17	20	13	10	7	6	10	140	11
Deer	12	15	15	15	11	20	7	16	19	8	133	12

Table 1-2. Number of vulture damage incidents by resource category reported to the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services program in Virginia, 1997 - 2001.

Resource	Damage	Total number of incidents			Dollar value reported
		Black vultures	Turkey vultures	Mixed vultures	
livestock	predation, injury, harassment ^a	392	4	5	133,305
livestock	damage or disease threat	22	0	4	0
livestock, fowl	predation	535	0	0	5,221
human health/ safety	disease threat, odor, fecal droppings	18	24	48	94
human health/safety aviation	damage threat, strike	0	3	0	0
boats	tearing	16	0	4	9,250
buildings (businesses)	fecal droppings, tearing roof/gaskets, nuisance	15	6	13	104,400
general property	fecal droppings, tearing	73	15	40	23,100
general property	nuisance, damage threat	9	3	25	0
homes	fecal droppings, nuisance	40	28	41	33,340
landscaping	fecal droppings, vegetation	3	11	22	5,600
pets	predation, injury, harassment	13	0	0	200
pets	disease	1	0	0	0
pets	threat ^b	3	2	4	0
utilities	fecal droppings	3	1	3	0
vehicles	tearing, fecal droppings	13	4	5	5,800
TOTAL		1,156	101	214	320,310

a. Harassment was an unsuccessful attack with no injury to the prey animal.

b. Threat was belief by pet owner that vultures would attempt to attack.

(Table 1-2). Lowney (1999) reported a similar pattern of livestock depredation by black vultures in Virginia from 1994 through 1996. Depredation on livestock by black vultures was reported throughout the year. However it occurred slightly more often January through April (Figure 1-1).

Predation by black vultures on livestock has been reported since the 1930's including domestic pigs in Kentucky (Lovell 1947, 1952) and Texas (Parmalee 1954), lambs in West Virginia (Roads 1936) and Ohio (Sprunt 1946), and cattle in Texas (Parmalee 1954). Black vulture predation on livestock is distinctive. Lovell (1947, 1952) and Lowney (1999) reported pigs being killed by black vultures plucking their eyes out followed by attacks to the rectum or attacks only to the rectum. Lowney (1999) further observed that black vultures preyed on calves less than 3 weeks old by primarily attacking the eyes, causing blindness, and then entered the abdomen through the rectum, vagina, or penis. Adult cows giving birth were attacked at the eyes, vagina, or rectum. A less frequent point of attack on cattle was the nose and tongue. Black vultures attacked lambs similarly as calves.

Predation by black vultures on cattle and farm-raised deer was reported in 32 Virginia counties from 1994 to 1996 with 43% and 33% of livestock predation reported from the Southwestern Ridge and Valley and Southern Piedmont physiographic regions, respectively (Lowney 1999). Vulture depredation occurred on livestock in 48 counties in Virginia from 1997 through 2001 (Figure 1-2). Black vultures also preyed on horses, goats, sheep, fallow deer, swine, dogs, cats, and turkeys (Lowney 1999). Attacks on domestic turkeys appeared to be on individuals with life threatening injuries from other predators (e.g., raccoons and skunks). While attacks on range chickens appeared to be predation on healthy birds. Black vultures were gregarious and groups averaging 20-60 individuals attacked prey animals (Lowney 1999).

1.3.4.2 Disease threat to livestock

Some livestock producers were concerned that vultures may spread disease through fecal droppings or from a farm with infected domestic animals to a farm with healthy animals. Bullock (1956) reported black and turkey vultures spread anthrax among infected and uninfected livestock farms through fecal droppings. While anthrax is rare in the United States, Bullock (1956) demonstrated that anthrax can survive the vulture's digestive system and vultures can spread infectious disease among livestock.

Mechanical transmission is the most probable means of spreading pathogens from vultures to livestock (T. Taylor, Veterinary Services, pers. commun.). Viruses and some bacteria are more likely to be mechanically transmitted to livestock or among farms than other pathogens. It is possible but less likely that pathogens would be transmitted to livestock through vulture fecal droppings because some bacteria die due to changes in temperature, humidity, or pH.

1.3.4.2.1 Disease threats to hogs from vultures

The hog industry is a vertically integrated industry. Whereas the cattle industry is less intensely managed and not vertically integrated. The hog industry faces a legitimate disease threat from vultures due to its vertical integration. In hogs, contagious contact is higher due to high density confinement of hogs, the environment around hogs houses, and confinement of pigs.

The hog industry in Virginia is especially concerned about three viruses and two bacterial infections. These diseases can cause devastating economic losses because

stopping the disease may require depopulating the farm. The diseases of concern are Porcine Reproductive and Respiratory Syndrome Virus (PRRS), Transmissible Gastroenteritis (TGE), Psuedorabies, Salmonella, and Escherichi coli.

PRRS is a virus that causes pregnant sows to abort or give birth to mummified fetuses (Baysinger and Cooper 1996). PRRS is a disease of regulatory concern. The Commonwealth of Virginia requires depopulation of the farm when PRRS occurs. This disease in a herd exposed to a virulent strain can be devastated (Baysinger and Cooper 1996). One hog producer in southeastern Virginia loses approximately 40% of its pregnant sows worth \$7 million dollars annually to PRRS (L. Gregory, pers. commun.). And this herd is vaccinated for PRRS. There is a vaccine for PRRS, however, the vaccine is strain specific and a farm can vaccinate its hogs for PRRS only to have a different strain of PRRS infect the herd.

TGE is a highly contagious, high morbidity disease, and it results in high mortality in young pigs (Hogg and Torres 1985). TGE is an intestinal virus resulting in vomiting and diarrhea. The disease is spread by aerosol or contact. Birds can be mechanical carriers of TGE by carrying the virus on their feet or feathers (Hogg and Torres 1985, Gough and Beyer 1982, T. Taylor, Veterinary Services, pers. commun.). Starlings and house sparrows can be as big a risk as vultures in spreading TGE (Gough and Beyer 1982, T. Taylor, Veterinary Services, pers. commun.). A farm must be depopulated to stop the spread of the disease.

Psuedorabies is an acute, highly contagious, frequently fatal virus affecting most domestic animals (Hogg and Beran 1987). It is also a disease of regulatory concern. State law requires immediate depopulation in psuedorabies positive herds. Currently, Virginia is free of psuedorabies in domestic hogs. This disease attacks the central nervous system and results in high mortality in young pigs. Other animals (rats) can be infected with psuedorabies and can spread the infection among farms (T. Taylor, Veterinary Services, pers. commun.).

Escherichi coli and salmonella are diseases of concern to the hog industry (L. Gregory, pers. commun., T. Taylor, Veterinary Services, pers. commun.). Hogs are vaccinated for these bacterial diseases but new strains can defeat the vaccines. Pathogenic strains of E. coli and salmonella have mild to severe response. These bacteria cause diarrhea and rarely is fatal. The bacterial pathogens are less contagious than the viral pathogens.

A pro-active response by the hog industry to the disease threat has been to implement minimal disease procedures. Hogs get minimal contact with people to reduce the risk of transmitting pathogens. These procedures require persons entering buildings containing hogs to shower and dip boots in foot baths. The foot baths sterilize boots with Tektrol. Farm employees are also assigned to work only one farm to prevent disease transmission among farms. Specialists may work multiple hog farms but have uniforms and boots at each farm to prevent transporting pathogens among farms. Vultures break the minimal disease procedures by their activities. Vulture loaf on and around buildings and sometimes enter buildings when doors are left open for maintenance, removing dead hogs, cooling, or accidentally. Vultures also defecate on walkways and leave feathers on walkways. Workers stepping on feces or feathers could mechanically transmit pathogens into the buildings and expose the hogs.

1.3.4.2.2 Disease threats to cattle from vultures

It is possible to transmit pathogens from vultures to cattle but the likelihood is low (T. Taylor, Veterinary Services, pers. commun.) . The cattle industry is less integrated and animals are confined at low densities on pastures. The cattle industry would be concerned about the mechanical transmission of E. coli, Salmonella, Infectious Bovine Rhinotracheitis, (IBR) and Bovine Virus Diarrhea (BVD). The diseases BVD and IBR are viral.

Bovine Virus Diarrhea is a reo-like virus can cause scours and the death rate may be as high as 50% (Hudson and White 1982). BVD also causes abortion, brain damage, and weak calves in cattle (Rice and Rogers 1993). A vaccine is available for BVD.

Infectious Bovine Rhinotracheitis is the cause of respiratory disease in cattle (Rice and Rogers 1993). The control of IBR can be achieved with vaccines and booster shots (Rice and Rogers 1993).

Salmonella and E. coli occur in cattle. E. coli O157 is a strain of concern. These bacterial pathogens are less contagious than viral pathogens (T. Taylor, Veterinary Services, pers. commun.) .

Table 1-3. Cities and towns in Virginia by region where vulture roosts are associated with property damage or human health and safety concerns. Damage was reported to Wildlife Services of the United States Department of Agriculture, Animal and Plant Health Inspection Service from 1992 to 2001.

<u>Southside</u>			<u>N. Virginia</u>	<u>Eastern Virginia</u>
Hurt		Tazewell		
Appomattox	Lynchburg	Wytheville	Fairfax	Chesapeake
Barhamsville	Phenix		Fredricksburg	Franklin
Bedford	Radford	<u>Central</u>	Leesburg	Hampton
Danville	Rocky Mount	Beaverdam	Culpepper	Virginia Beach
Bracey	Rustburg	Doswell	Marshall	King George
Brookneal	South Boston	Louisa	Middleburg	King William
Clarksville		Madison	Occoquan	Newport News
Chase City	<u>Southwest/ New River Valley</u>	Midlothian	Purcellville	Miller's Tavern
Cumberland	Glasgow	Richmond	Waterford	Suffolk
Gasburg	Hillsville	Moseley		Wakefield
Gretna	Radford	Troy	<u>Shenandoah Valley</u>	Williamsburg
Halifax	Roanoke		Staunton	<u>Eastern Shore</u>
	Salem		Waynesboro	Chincoteague

1.3.4.3 Damage management methods to protect livestock

There is a range of non-lethal methods available to alleviate black vulture predation on livestock. These nonlethal methods include harassment with 15mm pyrotechnics, shooting center-fire rifles over vultures loafing in pastures, shooting shotguns in the air, chasing vultures from the pasture with ATV's or vehicles, removing carrion from fields, burning or burying dead livestock, birthing inside buildings, moving expectant cattle to alternate pastures, dispersing nearby vulture roosts with harassment, cutting down trees used for loafing or roosting, and monitoring livestock multiple times per day. These techniques frequently are ineffective (Lowney 1999). Lowney (1999) reported that lethal methods were recommended in 43% of all livestock depredation

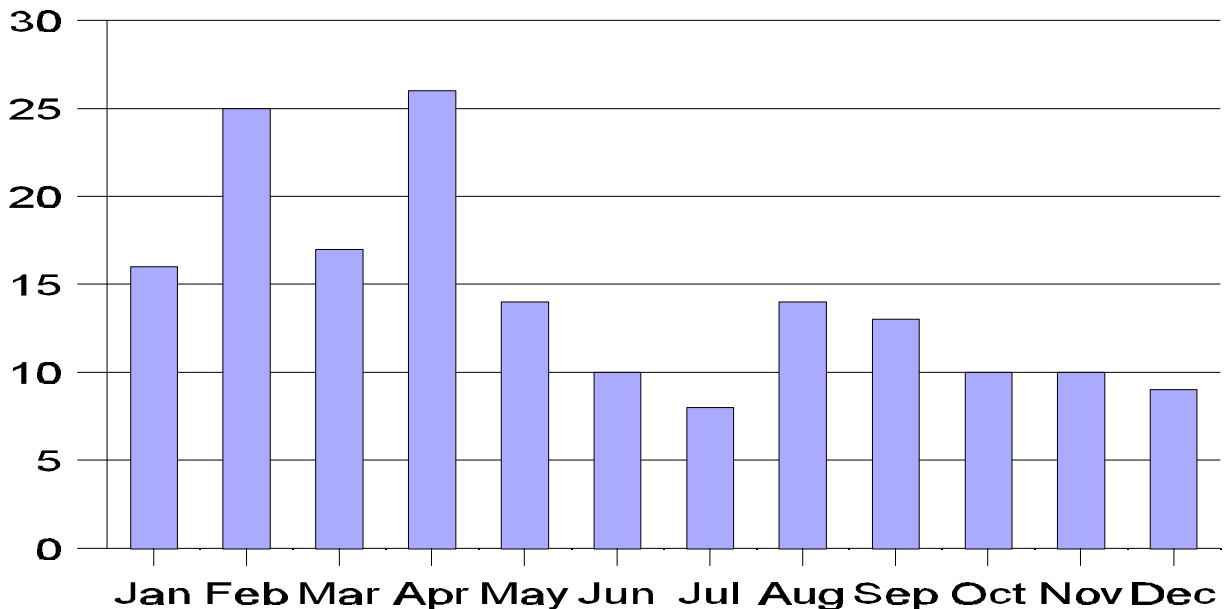


Figure 1-1. Monthly distribution of depredation reports on livestock by black vultures in Virginia, 1997 - 2001.

incidents from 1994 through 1996. WS recommended the issuance of migratory bird depredation permits in 47% of livestock depredation incidents involving black vultures from 1997 through 2001 (MIS, Annual Tables 1997 - 2001). These permits allow livestock producers to legally take vultures to supplement harassment and to protect their livestock from predation.

1.3.5 Need for Vulture Damage Management to Protect Human Health and Safety

Vultures can impact human health or safety through the threat of disease and as potential hazards to aviation. Mixed flocks of turkey and black vultures were generally reported as threats to human health and safety, or as a nuisance (Table 1-2) (Lowney 1999). Black and turkey vultures can be a nuisance with their droppings especially when they loaf on roofs of houses, office buildings, and electrical transmission towers. Many people consider vultures a nuisance because of the white-wash effect their droppings leave on trees at roost sites, ammonia odor emanating from roost sites, and a general feeling of doom when vultures congregate around homes.

1.3.5.1 Threat to aviation from vultures

Aircraft collisions with birds and other wildlife are a serious economic and safety problem

(Cleary et al. 2002, Dolbeer et al. 2000). They also can be a legal liability (Eschenfelder 1999). Eighty percent of bird strikes occur in the airport environment (Cleary et al. 1999). Seventy-one percent of bird strikes occur below 500 feet altitude above ground (Cleary et al. 2000), which is essentially during takeoff and landing. Wildlife strikes cost the aviation industry over \$465 million dollars annually (Cleary et al. 2002), cost the Air Force \$500 million dollars in damage from 1986 through 1997 (Lovell 1997), and cost the Navy \$217 million dollars in damage from 1986 through 1997 (Lovell 1997). The Air Force has also had 33 fatalities due to aircraft - wildlife strikes (Lovell 1997). Airports have been held liable for wildlife strikes with the courts awarding damages due to negligence (Eschenfelder 1999).

Vultures are the most hazardous bird for aircraft to strike (Dolbeer et al. 2000). Dolbeer et al. (2000) determined the relative hazard of wildlife to aircraft based on the percentage of strikes causing damage (vultures = 67%), effecting flight (vultures 40%), and the number of reports estimating the cost of damage. There have been vulture aircraft strikes reported at Washington Dulles International Airport, Newport News - Williamsburg International Airport, Richmond International Airport, and Ronald Reagan Washington National Airport (FAA, unpublished data). Vultures also were a safety concern at Accomack County Airport and Wallops Flight Facility due to vultures loafing on structures on the airfield and the proximity of nearby roosts (unpublished data). Vultures are a safety concern for military pilots on low-level, high speed missions. An F-16C struck a turkey vulture on a low-level flight and the bird penetrated the canopy resulting in the pilot ejecting and the plane crashing (Merritt 1989). The likelihood of an aircraft striking a vulture is low, but can result in economic damage or human death (U.S. Air Force, unpublished data, 1999).

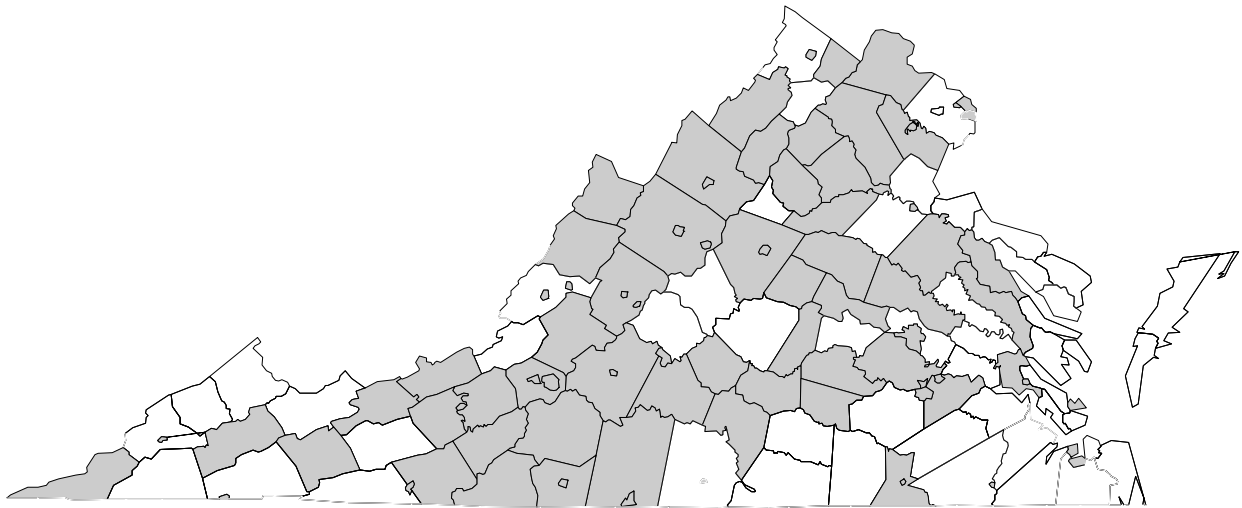
Human safety concerns about potential vulture-aircraft strike hazards are usually associated with a concentrations of vultures attracted by a nearby landfill. Concentrations of vultures can be hazardous to aircraft, especially when sanitary landfills are situated in close proximity (< 5 miles) to flight paths at airports (FAA 1997).

1.3.5.2 Threats to human health and safety

Vultures often form large communal roosts in winter and the buildup of fecal matter may lead to conditions favorable for the development of Histoplasmosis capsulatum. Roosts also occur in summer but usually have fewer vultures than the same roost in the winter. Histoplasmosis is a fungus that grows in the upper 2 inches of soil where bird or bat droppings have accumulated for 3 or more years (Lenhart et al. 1997, Weeks 1984). When dry soil is disturbed, the spores of the fungus become airborne and may enter the lungs of the people disturbing the soil. A histoplasmosis infection would begin in the lungs (Lenhart et al. 1997).

Hypersensitivity pneumonitis is thought to occur as the result of immunologic inflammation after inhalation and sensitization to an organic dust (Saltoun et al. 2000). Hypersensitivity pneumonitis to avian proteins has been reported in individuals working closely with birds in occupational or domestic settings (Saltoun et al. 2000). Hypersensitivity pneumonitis due to community exposure from Canada goose droppings in a suburban environment was reported by Saltoun et al. (2000). Recognition of this disease is important because continued exposure to antigens causing hypersensitivity pneumonitis can lead to pulmonary fibrosis and pulmonary insufficiency (Saltoun et al. 2000). This disease has not been investigated in vulture roosts, but similar conditions that implicate Canada geese in this disease warrant looking at bird roosts involving vultures, crows, blackbirds, and egret rookeries. Especially since some people exposed to strong ammonia odors from vulture roosts report difficulty breathing.

Figure 1-2. Counties (shaded) where vulture depredation on livestock were reported in Virginia, 1997 - 2001.



Vulture vomit and fecal droppings may contain pathogens harmful to people (Kalmbach 1939, Ohishi et al. 1979). Many of these pathogens would need to come into direct contact with people to be a health risk. Pathogens found in vulture vomit include botulism (*Clostridium botulinum*). The bacteria *Staphylococcus aureus* and *Pseudomonas aeruginosa* are found in the crop and stomach of black vultures (Schlatter et al. 1978) and these bacteria may be found in vulture vomit. The bacteria *Escherichia coli*, a bacteria apparently resistant to the vulture's stomach acid, is found in the cloaca of vultures (Schlatter et al. 1978). Since *Escherichia coli* is found in the cloaca of vultures it would be found in fecal droppings. Most people avoid vulture roosts when possible because of the strong ammonia odor, thus the risk to human health is probably

low.

1.3.6 Damage and conflicts with vultures at landfills

Black and turkey vultures feed and loaf at landfills in Virginia. The presence of vultures at landfills may present a threat to aviation, to agriculture resources (livestock) through disease transmission, and may attract other birds (gulls, crows, starlings) which may lead to other wildlife conflicts with these species.

The threat to aviation from vultures has been described in section 1.3.4.1. Vultures can congregate in large numbers at low altitudes at landfills especially in the morning and evening hours. Since 78% of bird strikes are at less than 1,000 feet elevation, 93% of bird strikes occur during take-off or landing, and vultures are the most hazardous bird for aircraft to strike (Cleary et al. 2002, Dolbeer et al. 2000), congregations of vultures near airfields are a hazard. Vultures are a threat to aviation when landfills are within 5 miles of an airfield and the flight path is over or adjacent to the landfill.

Vultures feed on carrion and meat products at landfills. Vultures also have the ability to transport pathogens mechanically or within their digestive systems (Bullock 1956, Schlater et al. 1978, T. Taylor, Veterinary Services, pers. commun.). Recently, Virginia had an outbreak of avian influenza in its poultry industry which required the destruction of 4.7 million domestic chickens and turkeys (Trice 2002). The euthanized birds were buried in a landfill and the landfill operator was required to implement an integrated bird control program to prevent the removal of infected poultry by scavengers. While the infected poultry were buried daily, scavengers attempted to feed on carcasses and meat scraps while being dumped from trucks or awaiting burial. Had the vultures exposed themselves to avian influenza infected carcasses, they could have become vectors to other poultry operations because vultures also feed and loaf at farms.

An integrated wildlife damage management program at a landfill may be primarily directed at gulls, but for the program to be effective all birds species that feed at the landfill must be dispersed. Gulls and starlings are species of birds which feed and loaf at landfills in large numbers (thousands or tens of thousands). Crows also feed and loaf at landfills in large numbers (100 to several hundred). Vultures also feed and loaf at landfills in large numbers (50 to several hundred). Since birds obtain behavioral cues from each other, vultures can serve as an attractant to other birds species. Vultures may be harassed or taken to reinforce harassment as part of an integrated wildlife damage management program at a landfill.

1.3.7 Examples of types of vulture damage and action taken to reduce damage

Examples of types of vulture damage experienced by landowners and land managers and damage abatement methods are provided to inform the reader about vulture damage management. The following are examples of vulture damage and methods implemented to alleviate damage occurring in Virginia. The names of towns or landowners and managers are omitted because of a preliminary injunction prohibiting WS from releasing the names of cooperators.

1.3.7.1 Large town in Virginia

This town of 22,000 residents has experienced property damage and health concerns caused by a flock of 230 turkey and black vultures roosting in town from November through April each year since 1990. The property damage included fecal droppings on vehicles and homes which required frequent washing to prevent the acid in the fecal droppings from damaging the paint. The roosting vultures have broken numerous limbs on large ornamental trees causing some trees to die. The accumulation of fecal droppings on lawns and walkways caused multiple problems from a repugnant strong ammonia odor, to loss of use of the property due to filth, and a nuisance.

The citizens affected by the vultures wanted a solution to the damage. Whereas the citizens unaffected by the vulture damage had a range of opinions from do something to assist landowners with vulture problems to leave the vultures alone because they are part of nature.

WS provided technical assistance to the town since 1993. Recommendations included implementation of an integrated harassment program using 15mm pyrotechnics, propane cannons, and sirens. The town implemented a nonlethal harassment program for the next 3 years (1994 - 1996) and moved the roost to three different locations in town resulting in different subdivisions being affected with the same damage as the section of town initially experiencing damage. Residents also used mylar tape and eye-spot balloons suspended from roost trees to disperse the vulture roost. Some of the black vultures ate the mylar tape. All the vultures moved from roost trees with mylar tape and balloons to adjacent trees without mylar tape and balloons. No food sources could be found that would attract and hold the vultures to this roost site. The habitat outside of town offered numerous locations with mature trees that appeared to be suitable roost habitat yet the vultures were reluctant to leave town.

By 1997 the number of vultures roosting in town had increased to 300 and the town was still unsuccessful at dispersing the vulture roost. The town had tried for nearly 8 years to disperse the vulture roost. In January 1998 the town requested WS implement a non-lethal harassment program to disperse the vulture roost. WS fired over 150 15mm pyrotechnics and 12 gauge shellcrackers over 6 nights to disperse the vultures. The town implemented a nonlethal harassment program with pyrotechnics in November 1998 which failed to disperse the roost. WS was requested to disperse the 320 vultures in December 1998 using an integrated wildlife damage management program. WS fired over 90 15mm pyrotechnics and 12 gauge shellcrackers and shot 7 vultures to reinforce harassment. The roost dispersed in December 1998 after 8 evenings. The town was vulture free in 1999 and the winter of 2000. The vultures returned in November 2000 and the town tried unsuccessfully to disperse the vultures with a propane cannon. WS then dispersed the 125 vultures in 4 nights firing 51 pyrotechnics and shooting 8 vultures to reinforce harassment. One vulture was suspended in a roost tree as an effigy to scare other vultures. In January 2002, WS was requested to disperse 160 vultures. WS fired 15mm pyrotechnics, shot 8 vultures to reinforce harassment, and flashed the vultures with a laser for 8 nights. WS reduced the number of vultures roosting in town to 60 birds before the vultures located a property in town where WS did not have access to shoot vultures habituated to harassment. Over the next 14 nights WS harassed the vultures with a laser and pyrotechnics on this property and continued the integrated wildlife damage management program (pyrotechnics, laser, shooting) at the original roost site which reduced the vulture roost population in town to 10. There were no suitable locations to suspend an effigy in 2002.

1.3.7.2 Second large town in Virginia

This town of 24,000 residents had experienced property damage and health concerns caused by a flock of 320 turkey vultures roosting in town from October through early April each year since 1992. The property damage included excessive amounts of fecal droppings and vomit on homes, in yards, and on children's play toys. Limbs of ornamental trees were broken by vultures which threatened the health of the trees. Affected homeowners had health concerns because of the accumulation of fecal droppings on property and strong ammonia odor emanating from the roost site. Many affected homeowners felt deprived of the ability to use their property because of the vultures and health concerns. Approximately 30 homeowners were affected by the roost. The citizens affected by the vultures wanted a solution to the damage. Whereas the citizens unaffected by the vulture damage had a range of opinions from do something to assist landowners with vulture problems to leave the vultures alone because they are part of nature.

WS has worked with the town for a number of years on the vulture roost problem by providing technical assistance. The town tried a nonlethal program which included 15mm pyrotechnics, 12 gauge shellcrackers, and flashing lights on a fire truck which were unsuccessful at dispersing the roost.

WS was requested in January 2000 to disperse the roost of 300 turkey vultures and 10 black vultures with nonlethal methods. After 10 nights of harassment with 1,699 pyrotechnics, the harassment effort failed as 100 turkey vultures remained at the roost site. The town requested WS implement an integrated wildlife damage management program in February 2000. The number of vultures had increased from 100 to 200 vultures since January 2000. The 200 vultures were dispersed in 5 days with an integrated wildlife damage management program using 205 pyrotechnics and shooting 21 vultures to reinforce harassment. A new roost formed approximately 3 miles away on a farm. The farmer later harassed the vultures and 40 resumed roosting in the town at the end of March 2000 before WS dispersed them again in 7 nights firing 40 pyrotechnics and shooting 8 turkey vultures to reinforce harassment. In November 2001 the town requested WS disperse a roost of 450 black and turkey vultures roosting in residential areas. WS implemented an integrated wildlife damage management program of lasers, dead vulture effigies, pyrotechnics, and shooting to reinforce harassment. WS fired 84 pyrotechnics, shot 32 vultures, suspended 4 effigies from roost trees, and flashed vultures with the laser which dispersed the roost in 5 nights in December 2001. Approximately one month later three roosts of 30 vultures each formed in large wooded tracts within the town limits and were not considered a problem, therefore no action was taken.

1.3.7.3 Recreation area

Approximately 450 black vultures have roosted at this recreation area for more than three years. The vultures at this location have caused extensive and expensive damage to parked cars and boat trailers. The vultures remove wiper blades from cars and trucks, scratch the paint on cars and trucks by walking upon the vehicles, tear car covers placed over vehicles, and leave excessive amounts of fecal droppings and vomit on vehicles, trailers, and the grounds. County officials estimate the vultures cause thousands of dollars in damage to private vehicles every weekend. The vulture damage resulted in fewer people using the park. The park is under-utilized by the public who were aware of the pervasive vulture damage to vehicles.

County officials requested assistance from WS whom provided technical assistance. Initially, the county officials implemented a nonlethal harassment program for 2 - 3 years using 15mm pyrotechnics but the vultures habituated to this routine. County officials then implemented an integrated wildlife damage management program in 2000 which included posting "Do not feed the wildlife" signs, harassment with 15mm pyrotechnics, and shooting vultures to reinforce harassment.

WS was requested by the adjacent property owner to disperse the roost when it was on the adjacent property. WS dispersed the roost using an integrated wildlife damage management program (e.g., pyrotechnics and shooting to reinforce harassment) and this provided benefits to the adjacent property owner but did not adequately solve the problem for the public using the recreation area as the damage to vehicles continued. The county has continued the integrated harassment program and the vultures continue to adapt to the harassment program. The local vulture population was reduced to approximately 50 birds in August 2002 and they were harassed with pyrotechnics.

1.3.7.4 Recreation area and camp

This recreation area and camp experienced significant property damage to the roofs of 5 buildings and the swimming equipment from 120 black vultures and 30 turkey vultures. The vultures caused \$39,000 in damage to the five roofs. Camp officials had health concerns because of the accumulation of fecal droppings around recreation and dining areas where hundreds of children played and ate daily during the summer. The vultures in this area were a major problem for property owners around the lake and nearby livestock producers for at least 12 years. These and other vultures roosting around the lake had been harassed extensively and killed illegally by residents. This area has a high incidence of vulture damage complaints. This area also has a very high frustration level among hundreds of residents in the area due to extensive annual vulture damage.

Officials had implemented a nonlethal program which included harassment and excluding vultures for 7 years. Technical assistance was provided by WS. Some of the methods used by camp officials included pyrotechnics and scarecrows to harass vultures, and overhead wire lines to exclude vultures.

WS was requested in August 2000 to assist the camp by dispersing the vulture roost. WS implemented an integrated wildlife damage management program to disperse the vulture roost in 5 nights by firing pyrotechnics and shooting 34 black vultures and 9 turkey vultures to reinforce harassment. The vultures remained dispersed until the following spring when some vultures returned. WS was requested in May 2001 to disperse the vultures again before the summer camping season. WS successfully dispersed the roost by shooting 8 black vultures and 14 turkey vultures to reinforce harassment.

1.3.7.5 Office park

WS received a request for assistance from a business in a large metropolitan area in July 2000 which had 4 turkey vultures and 2 black vultures picking at and pulling the latex window and door gaskets from the metal frames. The vultures also loafed on cars and pulled the wiper blades off the cars. The vultures' claws scratched the paint of cars they walked upon. The vultures were also a nuisance because they fought their reflection in the windows all day long which distracted employees. WS provided technical assistance and the office building received permission from the county to disperse the vultures with pyrotechnics. The vultures moved after several days to another business and started the same damage. WS also provided technical assistance to this business who also harassed the vultures with pyrotechnics. The vultures moved to a technical college and started the same damage.

The technical college requested assistance from WS and WS recommended a lethal program because it appeared the same damage was being caused by the same vultures being harassed in the same area by different businesses. This was explained to the technical college who agreed to have the vultures removed.

WS obtained permission from the county to shoot the vultures with a .25 caliber pellet rifle but no safe shots out of sight of the public were presented. WS then trapped the vultures with foothold traps set around a carcass on the roof of the technical college. Four vultures were trapped and euthanized following American Veterinary Medical Association guidelines. The damage at all affected properties ceased.

1.3.7.6 Industrial site

This industrial site had experienced power outages from the accumulation of fecal droppings on

power lines. The vultures also loafed on building roofs and equipment where employees worked. One rubber roof membrane was destroyed by the black vultures pecking and tearing it. Employees had health concerns because the walkways and electrical support structures were covered in fecal droppings from over 180 black vultures and 60 turkey vultures. They also complained of having to work in fecal droppings and vomit. The strong ammonia odor from the droppings was offensive to the employees. This roost increased from a few vultures to over 200 vultures in 3 years according to the Virginia Department of Game and Inland Fisheries.

The industrial site implemented a nonlethal program to disperse the vulture roost. They used plastic owls, flagging, horns, shouting, and clapping unsuccessfully.

WS was requested in September 2001 to disperse the vulture roost using an integrated wildlife damage management program. WS dispersed the vultures in 5 nights firing 18 pyrotechnics, shooting 35 black vultures and 1 turkey vulture to reinforce harassment, and suspending one dead vulture effigy. A follow up investigation in November indicated the vultures were roosting ½ mile away and there were no more problems.

1.3.7.7 Livestock farms with vulture predation

At least 18 cattle farms and 2 sheep farms in two counties were impacted by one vulture roost in Virginia. The cattle and sheep farms were all commercial producers raising from 49 to 400 head of adult cattle (not including calves) annually for beef production and 400 to 1,000 sheep annually. Beef cattle and sheep are raised on pasture. They are not raised in buildings because it negatively affects the health of the cattle and sheep by creating disease problems and it is not economically feasible to build barns large enough to hold several hundred animals. The roost was comprised of over 1,000 vultures and has occupied this roost site since at least 1973. All the farms except one were within 7 miles of the vulture roost. These farms had 3 cows killed, 1 cow injured, 122 calves killed, 2 calves injured, and 145 lambs killed by black vultures from 1995 through 2001. Calves were less than 3 weeks of age and most cows were attacked while giving birth. The actual number of livestock killed or injured by vultures from this roost is believed much higher as many livestock producers prefer to handle problems themselves and do not report damage. The high abundance of vultures and increasing population of black vultures persistently harassing and attacking livestock creates a feeling among some livestock producers of a never ending battle.

The cattle and sheep producers were conducting a range of husbandry and harassment practices to alleviate the predation problem. The husbandry practices included burying or incinerating dead livestock, placing expectant cows in a single pasture, picking up afterbirth, and where possible birthing cattle inside barns. Most cattle farms in Virginia have less than 1% annual mortality. Harassment practices included shooting pyrotechnics and guns in the air, chasing the vultures with All Terrain Vehicles and pickup trucks, turning dogs onto vultures loafing in pastures, and throwing dirt clods and rocks at black vultures. A few individuals cut down trees used as loafing sites by vultures. Most livestock producers have other jobs or the farms are so large they are unable to tend livestock all day long, seven days per week.

WS and Virginia Department of Agriculture and Consumer Services assisted many of the cattle producers in applying for migratory bird depredation permits so they could shoot some vultures to reinforce harassment. No single method or combination of nonlethal methods provided long term relief from vulture predation on livestock. Lethal methods used in conjunction with nonlethal methods have at least reduced the problem on specific farms. Individual farmers lacked the financial resources to request operational control of black vultures by WS. The

problem remains unresolved.

1.3.8 Summary of Types of Vulture Damage

Lowney (1999) reported the most significant damage by black vultures was predation, injury, and attempted attacks without injury (harassment) to livestock and pets and property damage (e.g., tearing upholstery, scratching paint, or tearing wiper blades from cars, trucks, tractors, and boats; and pecking and tearing roof shingles and latex window caulking and rubber window gaskets with their beaks)(Table 1-2). Turkey vultures caused little damage compared to black vultures and mixed flocks (Table 1-2). Turkey vultures were rarely reported killing or injuring livestock or pets, or destroying property (Table 1-2)(Lowney 1999). Turkey vultures have been reported pulling at latex or rubber window gaskets at office buildings in Virginia (unpub. data). Turkey vultures were infrequently reported as being a nuisance (Table 1-2). Both species can be hazardous to aircraft operations by loafing or soaring on or near airfields, or feeding, loafing, and soaring at landfills near airfields. Both vulture species have the potential to be vectors of animal disease to domestic livestock.

Turkey or black vultures or both vulture species may occupy roost sites in urban or suburban areas where they conflict with people. People tend to have health concerns about these roosts due to excessive accumulations of fecal droppings, concern for the health of children and pets who may be exposed to bacteria or viruses in vulture fecal droppings or vomit. Damage caused by turkey or black vulture roosts include loss of use of the property, the over-powering ammonia odor emanating from the roost site, death of ornamental trees from acidic fecal droppings or excessive limb breakage, and the aesthetically unappealing white-wash effect from fecal droppings on lawn furniture, the home, walkways, vehicles, and the yard.

1.4 RELATIONSHIP OF THIS ENVIRONMENTAL ASSESSMENT TO OTHER ENVIRONMENTAL DOCUMENTS

WS has issued a Final Environmental Impact Statement on the national APHIS/WS program (USDA 1997). This EA is tiered to the Final EIS. Pertinent information available in the FEIS has been incorporated by reference into this EA.

1.5 DECISIONS TO BE MADE

Based on the scope of this EA, the decisions to be made are:

- Should WS continue a VDM program in the State?
- If not, how should WS fulfill its legislative responsibilities for managing vulture damage in the State?
- Might the proposed WS VDM have significant impacts requiring preparation of an EIS?

1.6 RELATIONSHIP OF AGENCIES DURING PREPARATION OF THE EA

Base on agency relationships, MOU's, and legislative authorities, Virginia WS is the lead agency for this EA, and therefore responsible for the scope, contents, and decisions made. The United States Department of Interior, Fish and Wildlife Service (FWS) and Virginia Department of Game and Inland Fisheries (VDGIF) contributed input throughout the EA preparation to ensure an interdisciplinary approach in compliance with NEPA, and agency mandates, policies, and regulations.

1.7 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

1.7.1 Actions Analyzed. This EA evaluates vulture damage management by WS to protect property, livestock, pets, human health and safety, and agricultural resources on private land or public facilities within the State wherever such management is requested from the WS program.

1.7.2 Period for Which this EA is Valid. This EA will remain valid until WS determines that new needs for action or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document will be reviewed and revised as necessary. This EA will be reviewed each year to ensure that it is complete and still appropriate to the scope of the State VDM activities.

1.7.3 Site Specificity. This EA analyzes potential impacts of WS's VDM activities that will occur or could occur at private property sites or at public facilities within the Commonwealth of Virginia. Because the proposed action is to implement a state-wide IWDM VDM program, and because VA WS program goal's and responsibility's are to provide service when requested within the constraints of available funding and personnel, it is conceivable that VDM activity by WS could occur anywhere in the State. Thus, this EA analyzes the potential impacts of such efforts wherever and whenever they might occur as part of the proposed program. The EA emphasizes significant issues as they relate to specific areas whenever possible. However, the issues that pertain to the various types of vulture damage and resulting management are the same, for the most part, wherever they occur, and are treated as such. The standard WS Decision Model (Slate et al. 1992) and WS Directive 2.105 is the routine thought process that is the site-specific procedure for determining methods and strategies to use or recommend for individual actions conducted by WS in the State (See USDA 1997, Chapter 2 and Appendix N for a more complete description of the WS Decision Model and examples of its application). Decisions made using this thought process will be in accordance with any mitigation measures and standard operating procedures described herein and adopted or established as part of the decision.

1.8 AUTHORITY AND COMPLIANCE

1.8.1 Authority of Federal and State Agencies in Vulture Damage Management in the Commonwealth of Virginia¹

1.8.1.1 WS Legislative Authority

The primary statutory authority for the WS program is the Animal Damage Control Act of 1931 (7 U.S.C. 426-426c; 46 Stat. 1468), as amended in the Fiscal Year 2001 Agriculture Appropriations Bill, which provides that:

“The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001.”

Since 1931, with the changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing “bring (damage) under control”, rather than

¹ See Chapter 1 of USDA (1997) for a complete discussion of federal laws pertaining to WS.

“eradication” and “suppression” of wildlife populations. In 1988, Congress strengthened the legislative mandate of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. The Act states, in part:

That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and bird species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriations accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities.

1.8.1.2 Fish and Wildlife Service (FWS)

The FWS is responsible for managing and regulating take of native bird species that are listed as migratory under the Migratory Bird Treaty Act and those that are listed as threatened or endangered under the Endangered Species Act. Sections 1.8.2.2 and 1.8.2.3 below describe WS’s interactions with the FWS under these two laws.

1.8.1.3 Virginia Department of Game and Inland Fisheries Legislative Mandate

The Virginia Department of Game and Inland Fisheries (VDGIF), under the direction of the Governor-appointed Board of Directors, is specifically charged by the General Assembly with the management of the state’s wildlife resources. Although many legal mandates of the Board and the Department are expressed throughout the Code of Virginia, the primary statutory authorities include wildlife management responsibilities (29.1-103), public education charges (29.1-109), law enforcement authorities (29.1-109), and regulatory powers (29.1-501). In 1990, the Board of Directors adopted mission statements to help clarify and interpret the role of VDGIF in managing the wildlife resources of Virginia.

They are:

To manage Virginia’s wildlife and inland fisheries to maintain optimum populations of all species to serve the needs of the Commonwealth;

To provide opportunity for all to enjoy wildlife, inland fisheries, boating and related outdoor recreation; and

To promote safety for persons and property in connection with boating, hunting, and fishing.

VDGIF currently has a Memorandum of Understanding (MOU) with WS. This document establishes a cooperative relationship between WS and VDGIF, outlines responsibilities, and sets forth annual objectives and goals of each agency for resolving wildlife damage management conflicts in Virginia.

1.8.1.4 Virginia Department of Agriculture and Consumer Services Legislative Mandate

Virginia Department of Agriculture and Consumer Services (VDACS) has the statutory authority to manage damage to agriculture and property, and to protect human health and safety from damage involving birds (Title 3.1 - 1011). VDACS currently has a MOU with WS which

establishes a cooperative relationship between WS and VDACS, outlines responsibilities, and sets forth annual objectives and goals of each agency for resolving wildlife damage management conflicts in Virginia.

1.8.2 COMPLIANCE WITH OTHER FEDERAL LAWS.

Several other federal laws authorize, regulate, or otherwise affect WS wildlife damage management. WS complies with these laws, and consults and cooperates with other agencies as appropriate.

1.8.2.1 National Environmental Policy Act (NEPA)

WS prepares analyses of the environmental impacts of program activities to meet procedural requirements of this law. This EA meets the NEPA requirement for the proposed action in Virginia. When WS operational assistance is requested by another federal agency, NEPA compliance is the responsibility of the other federal agency. However, WS could agree to complete NEPA documentation at the request of the other federal agency.

1.8.2.2 Endangered Species Act (ESA)

It is federal policy, under the ESA, that all federal agencies shall seek to conserve threatened and endangered (T&E) species and shall utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). WS conducts Section 7 consultations with the U.S. Fish & Wildlife Service (FWS) to use the expertise of the FWS to ensure that *"any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency shall use the best scientific and commercial data available"* (Sec.7(a)(2)). WS obtained a Biological Opinion (B.O.) from FWS in 1992 describing potential effects on T & E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, Appendix F).

Section 9 of the ESA makes it illegal for any person subject to the jurisdiction of the United States to "take" any federally listed endangered or threatened species of fish or wildlife without a special exemption. Under the ESA, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to breeding, feeding, and sheltering.

1.8.2.3 Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711; 40 Stat. 755), as amended.

The Migratory Bird Treaty Act (MBTA) provides the FWS regulatory authority to protect families of birds that contain species which migrate outside the United States. The law prohibits any "take" of these species by private entities, except as permitted by the FWS; therefore the FWS issues depredation permits to private entities for reducing bird damage. WS will obtain depredation permits covering VDM activities that involve the taking of species for which such permits are required in accordance with the MBTA and FWS regulations, or will operate as a named agent on MBTA permits obtained by cooperators.

WS provides assessments for persons experiencing migratory bird damage to obtain information on which to base damage management recommendations. Damage management

recommendations could be in the form of technical assistance or operational assistance. In severe cases of vulture damage, WS provides recommendations to the FWS for the issuance of depredation permits to private and public entities. The ultimate responsibility for issuing such permits rests with the FWS.

1.8.2.4 National Historic Preservation Act (NHPA) of 1966 as amended

The National Historic Preservation Act (NHPA) of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that can result in changes in the character or use of historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian Tribes to determine whether they have concerns for traditional cultural properties in areas of these federal undertakings. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties. WS activities as described under the proposed action do not cause ground disturbances nor do they otherwise have the potential to significantly affect visual, audible, or atmospheric elements of historic properties and are thus not undertakings as defined by the NHPA. VDM could benefit historic properties if such properties were being damaged by birds. In those cases, the officials responsible for management of such properties would make the request and would have decision-making authority over the methods to be used. Harassment techniques that involve noise-making could conceivably disturb users of historic properties if they were used at or in close proximity to such properties; however, it would be an exceedingly rare event for noise-producing devices to be used in close proximity to such a property unless the resource being protected from vulture damage was the property itself, in which case the primary effect would be beneficial. Also, the use of such devices is generally short term and could be discontinued if any conflicts with historic properties arose. WS has determined VDM actions are not undertakings as defined by the NHPA because such actions do not have the potential to result in changes in the character or use of historic properties. A copy of this EA is being provided to Chickahominy, Mattaponi, Monacan, and Pamunkey American Indian tribe in the State to allow them opportunity to express any concerns that might need to be addressed prior to a decision.

1.8.2.5 Environmental Justice and Executive Order 12898 - *"Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."*

Executive Order 12898, entitled, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. It is a priority within APHIS and WS. Executive Order 12898 requires Federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898. WS personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. It is not anticipated that the proposed action would result in any adverse or disproportionate

environmental impacts to minority and low-income persons or populations.

1.8.3 COMPLIANCE WITH OTHER STATE LAWS.

1.8.3.1 Virginia Nuisance Bird Law

This Act allows the Commissioner of Agriculture for VDACS to conduct surveys and investigations of economic loss or public nuisances caused by birds. The Commissioner may then develop a plan of action when birds are causing economic loss or are detrimental to the health and welfare of the public, or create a public nuisance. This Act also allows the Commissioner to provide technical assistance for the suppression of nuisance birds. This Act allows the Commissioner to cooperate with federal and state agencies, other public and private agencies, organizations, institutions, and persons.

1.8.3.2 Possession, Transportation, and Release of Wildlife by Authorized Persons

This regulation (4 VAC 15-30-50) authorizes employees of federal wildlife management agencies and local animal control officers in the performance of their duties to take problem wildlife in the Commonwealth of Virginia. According to VDGIF, permits to take migratory birds are issued by the FWS and not VDGIF, therefore no state permit is required of WS to take migratory birds in Virginia.

1.9 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of four (4) chapters and three (3) appendices. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, alternatives not considered in detail, mitigation and standard operating procedures (SOP). Chapter 4 analyzes environmental consequences and the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers of this EA. Appendix A contains the literature cited used during the preparation of the EA. Appendix B contains a description of the methods used or recommended to reduce damage caused by vultures.

2.0 CHAPTER 2 - ISSUES

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental impacts analysis in Chapter 4 (Environmental Consequences), issues that have driven the development of mitigation measures and/or standard operating procedures, and issues that will not be considered in detail, with rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop mitigation measures. Additional description of affected environments will be incorporated into the discussion of the environmental impacts in Chapter 4.

2.1 Issues. The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on Target Bird Species Populations
- Effects on Nontarget Wildlife Species Populations, including T&E Species
- Effects on Human Health and Safety
- Effects on Aesthetics
- Humaneness of Lethal Bird Control Methods

2.2 ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES

2.2.1 Effects on Target Bird Species Populations

A common concern among members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA are the turkey vulture and the black vulture of which no more than 1,500 turkey vultures and 2,500 black vultures are likely to be killed by WS's use of lethal control methods under the proposed action in any one year.

2.2.2 Effects on Nontarget Species populations, including T&E Species

A common concern among members of the public and wildlife professionals, including WS personnel, is the impact of damage control methods and activities on nontarget species, particularly Threatened and Endangered Species. WS's standard operating procedures include measures intended to mitigate or reduce the effects on nontarget species populations and are presented in Chapter 3.

Special efforts are made to avoid jeopardizing Threatened and Endangered Species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the FWS under Section 7 of the Endangered Species Act (ESA) concerning potential impacts of VDM methods on T&E species and has obtained a Biological Opinion (B.O.). For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997, Appendix F). WS is also in the process of reinitiating Section 7 consultation at the program level to assure that potential effects on T&E species have been adequately addressed.

2.2.3 Effects on Human Health and Safety

2.2.3.1 Impacts on human safety of VDM methods

Some people may be concerned that WS's use of firearms, pyrotechnic bird scaring devices, traps, and lasers could cause injuries to people. WS personnel occasionally use rifles and shotguns to remove vultures that are causing damage. There is some potential fire hazard to private property from pyrotechnic use. There is also the potential of a safety hazard to

automobile drivers that may be distracted by harassment efforts, resulting in an accident. There is little potential of human exposure to foothold traps because they are set on the roofs of buildings. There is minimal potential for flash blindness, afterimage, and glare to people due to the laser.

2.2.3.2 Impacts on human safety of not conducting VDM to reduce disease outbreaks and bird strike hazards at airports

The concern stated here is that the absence of adequate VDM would result in adverse effects on human health and safety, because the transmission of bird-borne diseases and bird strikes on aircraft would not be curtailed or reduced to the minimum levels possible and practical. Although WS does not receive many requests to conduct VDM for disease outbreaks. WS receives some requests to reduce hazards at airports. The potential impacts of not conducting such work could lead to increased incidence of bird-borne diseases in humans, or injuries or loss of human lives from bird strikes to aircraft.

2.2.4 Effects on Aesthetics

2.2.4.1 Effects on Human Affectionate-Bonds with Individual Birds and on Aesthetic Values of Wild Bird Species

Some individual members or groups of wild bird species habituate and learn to live in close proximity to humans. Some people in these situations feed such birds and/or otherwise develop emotional attitudes toward such animals that result in aesthetic enjoyment. In addition, some people consider individual wild birds as “pets,” or exhibit affection toward these animals. Examples would be people who visit a city park to feed waterfowl or pigeons and homeowners who have bird feeders or bird houses. Many people do not develop emotional bonds with individual wild animals, but experience aesthetic enjoyment from observing them.

Public reaction to damage management actions is variable because individual members of the public can have widely different attitudes toward wildlife. Some individuals that are negatively affected by wildlife support removal or relocation of damaging wildlife. Other individuals affected by the same wildlife may oppose removal or relocation. Individuals unaffected by wildlife damage may be supportive, neutral, or opposed to wildlife removal depending on their individual personal views and attitudes.

The public’s ability to view wild birds in a particular area would be more limited if the birds are dispersed, removed, or relocated. However, immigration of birds from other areas could possibly replace the animals dispersed, removed or relocated during a damage management action. In addition, the opportunity to view or feed other birds would be available if an individual makes the effort to visit other areas away from the area where damage abatement methods are being implemented. Even where damage abatement methods are being implemented, vultures frequently are available for viewing, albeit in lower abundance.

Some people do not believe that individual birds or nuisance bird roosts should even be harassed to stop or reduce damage problems. Some of them are concerned that their ability to view birds and other wildlife species are lessened by WS non-lethal harassment efforts.

2.2.4.2 Effects on Aesthetic Values of Property Damaged by Birds

Property owners that have vultures roosting in trees or loafing on buildings on their property or

on nearby adjacent properties are generally concerned about the negative aesthetic appearance of bird droppings and negative symbolism of vultures associated with death. Property owners may be concerned about declining market value of their homes and future resale value. Business owners generally are particularly concerned because negative aesthetics can result in lost business. Costs associated with property damage include labor and disinfectants to clean and sanitize fecal droppings, implementation of nonlethal wildlife management methods, loss of property use, loss of aesthetic value of homes, businesses, and property where vultures are roosting or loafing, loss of customers or visitors irritated by the odor of or of having to walk on fecal droppings, and loss of time contacting local health departments and wildlife management agencies on health and safety issues.

2.2.5 Humaneness and Animal Welfare Concerns of Lethal Methods Used by WS.

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if "*... the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process.*"

Suffering is described as a "*... highly unpleasant emotional response usually associated with pain and distress.*" However, suffering "*... can occur without pain ...*," and "*... pain can occur without suffering ...*" (AVMA 1987). Because suffering carries with it the implication of a time frame, a case could be made for "*... little or no suffering where death comes immediately ...*" (CDFG 1991), such as shooting.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "*... probably be causes for pain in other animals ...*" (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 1991).

Pain and suffering, as it relates to WS damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since "*... neither medical or veterinary curricula explicitly address suffering or its relief*" (CDFG 1991).

Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some VDM methods are used in situations where nonlethal damage management methods are not practical or effective.

VA WS personnel are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology, workforce and funding. Mitigation measures/SOPs used to maximize humaneness are listed in Chapter 3.

2.3 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

2.3.1 Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area.

Some individuals might question whether preparing an EA for an area as large as Virginia would meet the NEPA requirements for site specificity. Wildlife damage management falls within the category of federal or other agency actions in which the exact timing or location of individual activities cannot usually be predicted well enough ahead of time to accurately describe such locations or times in an EA or EIS. The WS program is analogous to other agencies or entities with damage management missions such as fire and police departments, emergency clean-up organizations, insurance companies, etc. Although WS can predict some of the possible locations or *types* of situations and sites where some kinds of wildlife damage will occur, the program cannot predict the specific locations or times at which affected resource owners will determine a bird damage problem has become intolerable to the point that they request assistance from WS. Nor would WS be able to prevent such damage in all areas where it might occur without resorting to destruction of wild animal populations over broad areas at a much more intensive level than would be desired by most people, including WS and state agencies. Such broadscale population control would also be impractical, if not impossible, to achieve.

If a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire State may provide a better analysis than multiple EA's covering smaller zones.

2.3.2 Impacts of Harassment and Removal Methods on Other Migratory Bird Species

Some people are concerned with the impacts of WS's non-lethal and lethal control methods on other migratory bird species. WS abides by laws and regulations of the MBTA regarding the removal and harassment of migratory birds (50 CFR 21). WS minimizes potential impacts to non-target and target migratory bird species with mitigation measures/SOP's listed in Chapter 3. Non-target migratory bird species usually are not affected by WS's control methods, except for the occasional scaring effect from the sound of gunshots or scaring devices. In these cases, nontarget migratory birds may temporarily leave the immediate vicinity of shooting/scaring, but would most likely return after conclusion of the action.

3.0 CHAPTER 3: ALTERNATIVES INCLUDING THE PROPOSED ACTION

WS developed alternatives to solve vulture damage and will analyze these alternatives (*see* Chapter 4). The purpose is to identify the appropriate alternative to alleviating vulture damage.

Alternatives analyzed in detail are:

- 1) Alternative 1 - Integrated Wildlife Damage Management/Vulture Damage Management Program (Proposed Action/No Action). This is the Proposed Action as described in Chapter 1.
- 2) Alternative 2 - Nonlethal VDM Only By WS
- 3) Alternative 3 - Technical Assistance Only. Under this alternative, WS would not conduct any direct operational VDM activities in Virginia. If requested, affected individuals would be provided with technical assistance information only.
- 4) Alternative 4 - Lethal VDM Only By WS
- 5) Alternative 5 - No Federal WS VDM. This alternative consists of no federal VDM program by WS.

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1 - Integrated Wildlife Damage Management/ Vulture Damage Management Program (Proposed Action).

The proposed action is for the WS program in the Commonwealth of Virginia to continue the current Integrated Wildlife Damage Management (IWDM) program that will respond to requests for VDM to protect property, livestock, pets, human health and safety, and agricultural resources in the Commonwealth of Virginia. An IWDM approach would be implemented which would allow use of any legal technique or method, used singly or in combination, to meet requestor needs for resolving conflicts with turkey or black vultures (Appendix B). Cooperators requesting assistance would be provided with information regarding the use of effective nonlethal and lethal techniques. Lethal methods used by WS would include shooting and live trapping followed by euthanasia. Nonlethal methods used by WS may include habitat alteration, husbandry practices, wire barriers and deterrents, tactile repellents, harassment, and scaring devices. In many situations, the implementation of nonlethal methods such as habitat alteration, husbandry practices, harassment, scare devices, and mechanical repellents would be the responsibility of the requestor to implement. VDM by WS would be allowed in the State, when requested, on private property sites or public facilities where a need has been documented, upon completion of an *Agreement for Control*. All management actions would comply with appropriate federal, state, and local laws.

3.1.2 Alternative 2 - Nonlethal VDM Only By WS.

Under this alternative, only nonlethal direct control activities and technical assistance would be provided by WS to resolve vulture damage problems. Persons receiving technical assistance could still resort to lethal methods that were available to them. Requests for information regarding lethal management approaches would be referred to VDGIF, VDACS, FWS, local animal control agencies, or private businesses or organizations. Individuals or agencies might choose to implement WS nonlethal recommendations, implement lethal methods or other methods not recommended by WS, contract for WS nonlethal direct control services, use contractual services of private businesses, use volunteer services of

private organizations, or take no action. In some cases, control methods employed by others could be contrary to the intended use or in excess of what is necessary. Appendix B describes a number of nonlethal methods available for use or recommendation by WS under this alternative.

3.1.3 Alternative 3 - Technical Assistance Only.

This alternative would not allow for WS operational VDM in Virginia. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, or others could conduct VDM using traps, shooting, or any nonlethal method that is legal. Appendix B describes a number of methods that could be employed by private individuals or other agencies after receiving technical assistance advice under this alternative.

3.1.4 Alternative 4 - Lethal VDM Only By WS.

Under this alternative, only lethal direct control services and technical assistance would be provided by WS. Technical assistance would include making recommendations to the FWS regarding the issuance of permits to resource owners to allow them to take vultures by lethal methods. Requests for information regarding nonlethal management approaches would be referred to VDGIF, VDACS, FWS, local animal control agencies, or private businesses or organizations. Individuals or agencies might choose to implement WS lethal recommendations, implement nonlethal methods or other methods not recommended by WS, contract for WS lethal direct control services, use contractual services of private businesses, use volunteer services of private organizations, or take no action. In some cases, control methods employed by others could be contrary to the intended use or in excess of what is necessary. Not all of the methods listed in Appendix B as potentially available to WS would be legally available to all other agencies or individuals.

3.1.5 Alternative 5 - No Federal WS VDM.

This alternative would eliminate WS involvement in VDM in Virginia. WS would not provide direct operational or technical assistance, and requesters of WS services would have to conduct their own VDM without WS input.

3.2 VDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN VIRGINIA

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2, 3 and 4 described above. Alternative 5 would terminate both WS technical assistance and operational VDM by WS. Appendix B is a more thorough description of the methods that could be used or recommended by WS.

3.2.1 Integrated Wildlife Damage Management (IWDM).

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in a cost-effective² manner while minimizing the potentially harmful effects on humans, target and nontarget species, and the environment. IWDM may incorporate cultural practices (i.e., animal husbandry), habitat modification (i.e., removing roost trees), animal behavior modification (i.e., scaring, tactile repellents), removal of individual offending animals, local population

²The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

reduction, or any combination of these, depending on the circumstances of the specific damage problem.

3.2.2 The IWDM Strategies That WS Employs Under the Proposed VDM Program -Alternative 1 (Proposed Action/No Action).

3.2.2.1 Technical Assistance Recommendations.

“Technical assistance” as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods. The implementation of damage management actions is the responsibility of the requester. In some cases, WS loans or sells supplies or materials that are of limited availability for non-WS entities to use. Technical assistance may be provided following a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and the practicality of their application.

Under APHIS NEPA Implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving bird damage problems.

3.2.2.2 Migratory Bird Depredation Permit

Migratory bird depredation permits (50 Code of Federal Regulations [CFR] 21.41) may be issued by the FWS to landowners and government agencies to take migratory birds to protect private and public property and human health or safety. The migratory bird depredation permit process is the responsibility of the FWS. The process involves two federal and one state agency in Virginia. Permit applications are available from FWS or WS.

Landowners, land managers, or public officials may contact WS for technical assistance to alleviate damage involving migratory birds. WS will consult with the landowner, land manager, or public official about strategies and methods to alleviate migratory bird damage. WS may recommend lethal methods be used to alleviate the damage. The landowner, land manager, or public official may then decide to apply for a permit to use a lethal method on a migratory bird problem.

The permit applicant must complete a migratory bird depredation permit application, review 50 CFR, Parts 10, 13, and 21, and pay a \$25 processing fee to the FWS. Government agencies are exempt from the processing fee. WS will then complete a migratory bird damage project report. This report describes the resources harmed, the type damage, migratory bird species and number involved, type of assistance provided, damage abatement methods tried and recommended, other information, and WS recommendation whether a permit should be issued and the number of birds, nests, or eggs to be taken. The FWS reviews the permit application and WS report. The FWS makes a decision to issue a permit or deny the issuance of the permit.

If the FWS decides to issue the permit, the permit is sent to the Virginia Department of Game and Inland Fisheries (VDGIF) for review. If VDGIF concurs, then FWS issues the permit to the applicant. The permit may be valid for up to one year. Permits are renewable by reapplying annually.

Migratory Bird Depredation Permits were issued to landowners and managers in Virginia to

protect property, human health and safety, and agricultural resources. The permits were issued after WS made a recommendation to the FWS regarding the issuance of the permit to alleviate damage. Migratory Bird Depredation Permits were recommended to alleviate vulture damage to property in 19% of incidents from 1997 through 2001 (MIS, Annual Tables 1997 - 2001). Lowney (1999) reported that lethal methods were recommended in 43% of all livestock depredation incidents from 1994 through 1996. WS recommended the issuance of migratory bird depredation permits in 47% of livestock depredation incidents involving black vultures from 1997 through 2001 (MIS, Annual Tables 1997 - 2001). Migratory bird depredation permits were recommended in 7% of incidents where vultures were reported to threaten human health or safety (MIS, Annual Tables 1997 - 2001).

3.2.2.3 Education

Education is an important element of WS's program activities because wildlife damage management is about finding "balance" or co-existence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures and demonstrations are provided to farmers, homeowners, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, laws and regulations, and agency policies.

WS provides informational leaflets about vulture damage management, vulture biology and ecology, and about specific methods (e.g., sources of pyrotechnics). The WS program in Virginia provided 995 leaflets to the public about vulture damage management, and sources of pyrotechnics from 1997 - 2001. Additionally, leaflets about managing vulture damage were given to the VDGIF to distribute to the public requesting assistance about vulture damage.

3.2.2.4 Direct Damage Management Assistance.

This is the conducting or supervision of damage management activities by WS personnel. Direct damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone, and when *Agreements for Control* or other comparable instruments provide for WS direct damage management. The initial investigation defines the nature, history, extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. Professional skills of WS personnel are often required to effectively resolve problems, especially if the problem is complex.

3.2.3 WS Decision Making.

WS personnel use a thought process for evaluating and responding to damage complaints that is depicted by the WS Decision Model described by Slate et al. (1992) (Figure 3-1). WS personnel are frequently contacted after requesters have tried or considered nonlethal methods and found them to be impractical, too costly, or inadequate for reducing damage to an acceptable level. WS personnel assess the problem, evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation are developed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended. In terms of the WS

Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a documented process, but a mental problem-solving process common to most if not all professions.

3.2.4 Decision making by private landowners

The decision maker for private property is the property owner or manager. WS would provide technical assistance to this person and recommendations to reduce damage. Direct control would be provided by WS if requested, funding provided, and the requested direct control was in line with WS recommendations.

3.2.5 Decision making by public land managers and local government officials

The decision maker for local, state, or federal property would be the official responsible for or authorized to manage the public land to meet interests, goals and legal mandates for the property. Locally elected government officials would be the official(s) responsible for deciding appropriate management actions when the town or city is taking responsibility and funding efforts to alleviate wildlife damage for the town or city. WS would provide technical assistance to this person(s) and recommendations to reduce damage. Direct control would be provided by WS if requested, funding provided, and the requested direct control was in line with WS recommendations.

3.2.6 Vulture Damage Management Methods Available for Use. (See Appendix B for detailed descriptions of VDM Methodologies)

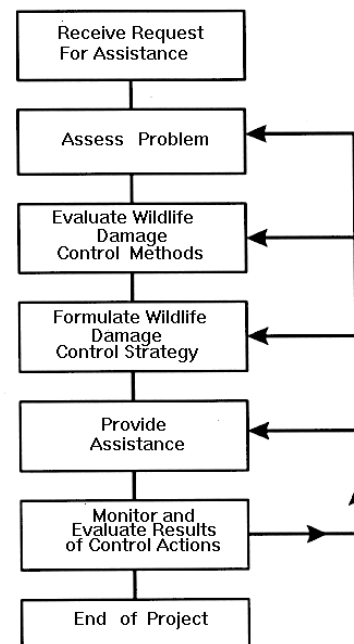
3.2.6.1 Nonlethal Methods (See Appendix B for detailed descriptions)

Livestock producer and property owner practices consist primarily of nonlethal preventive methods such as cultural methods³ and habitat modification.

Animal behavior modification refers to tactics that alter the behavior of birds to reduce damages. Some but not all of these tactics include:

- Wire barriers and chemical repellents
- Propane exploders (to scare birds)
- Pyrotechnics (to scare birds)
- Distress calls and sound producing devices (to scare birds)
- Visual repellents and scaring

Figure 3-1. APHIS, WS Decision Model



³ Generally involves modifications to the management of protected resources to reduce their vulnerability to wildlife damage..

- tactics
- Lasers (to scare birds)
- Effigies (to scare birds from roost sites and loafing sites)

Habitat/environmental modification to attract or repel bird species.

3.2.6.2 Mechanical, Lethal Methods (See Appendix B for detailed descriptions)

Shooting is the practice of selectively removing target birds by shooting with a shotgun or rifle. Shooting a few individuals from a larger flock can reinforce birds' fear of harassment techniques. Shooting with rifles or shotguns is used to manage vulture damage problems when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible. Shooting is an American Veterinary Medical Association (AVMA) approved method of euthanasia (Beaver et al. 2001) and may be sometimes used to euthanize birds which are captured in live traps.

Live traps are traps designed to capture birds alive for euthanasia. Traps that are available for VDM include but are not limited to baited corral traps, modified padded-jaw foothold traps, and rocket or cannon nets..

Cervical dislocation is an AVMA approved euthanasia method which is sometimes used to euthanize birds which are captured in live traps (Beaver et al. 2001).

3.2.6.3 Chemical, Lethal Methods (See Appendix B for detailed descriptions)

Carbon dioxide (CO₂) gas is an American Veterinary Medical Association (AVMA) approved euthanasia method which is sometimes used to euthanize birds which are captured in live traps and when relocation is not a feasible option (Beaver et al. 2000). Live birds are placed in a container or chamber into which CO₂ gas is released. The birds quickly expire after inhaling the gas.

Table 3-1. Black and turkey vultures killed and dispersed by the Virginia Wildlife Services program of the United States Department of Agriculture, Animal and Plant Health Inspection Service to alleviate damage.

<u>Year</u>	<u>No. black vultures killed</u>	<u>No. turkey vultures killed</u>	<u>No. black vultures dispersed</u>	<u>No. turkey vultures dispersed</u>	<u>No. mixed vultures dispersed</u>
2001	107	52 ¹	0	1,137	357
2000	61	43	535	1,987	40
1999	2	18	0	350	948
1998	2 ²	7	0	0	1,120
1997	0	0	n/a	n/a	n/a
1996	0	0	n/a	n/a	n/a
1995	0	0	n/a	n/a	n/a
1994	5	1	n/a	n/a	n/a
1993	0	0	n/a	n/a	n/a

1. Thirty-seven turkey vultures captured at one site to control black vulture predation on livestock were freed.
2. Forty black vultures captured as part of a roost relocation project were freed.

3.2.7 Alternative 2 - Nonlethal VDM Only By WS

This alternative would require that WS only utilize nonlethal methods (3.2.6.1) in addressing vulture damage problems, including nonlethal technical assistance recommendations. Producers, state agency personnel, or others could conduct VDM activities including the use of traps, shooting, and any lethal or nonlethal methods they deem effective .

3.2.8 Alternative 3 - Technical Assistance Only

This alternative would not allow WS operational VDM in the State. WS would only provide technical assistance and make recommendations when requested. Producers, state agency personnel, or others could conduct VDM activities including the use of traps, shooting, and any lethal or nonlethal methods they deem effective.

3.2.9 Alternative 4 - Lethal VDM Only By WS

This alternative would require that WS only utilize lethal control methods (3.2.6.2 and 3.2.6.3) in addressing vulture damage problems, including lethal technical assistance recommendations. WS would provide recommendations to the FWS regarding the issuance of permits to resource owners to allow them to take vultures by lethal methods. Producers, state agency personnel, or others could conduct VDM activities including the use of traps, shooting, and any lethal or nonlethal methods they deem effective.

3.2.10 Alternative 5 - No Federal WS VDM

This alternative would consist of no WS involvement in VDM in the State. Neither direct operational management assistance nor technical assistance to provide information on nonlethal and/or lethal management techniques would be available from WS. Producers, state agency personnel, or others would be left with the option to conduct their own VDM activities including the use of traps, shooting, and any lethal or nonlethal methods they deem effective.

3.3 Alternatives Considered But Not Analyzed in Detail With Rationale

3.3.1 Live trap and relocation

Relocation of damaging birds to other areas following live capture generally would not be effective nor cost-effective. As a short term solution, vultures have been relocated but returned to the trap site within eight months (Humphrey et al. 2000). Relocation to other areas following live capture would not generally be effective because problem bird species are highly mobile and can easily return to damage sites from long distances (Humphrey et al. 2000), habitats in other areas are generally already occupied, and relocation may result in bird damage problems at the new location. Humphrey et al. (2000) also reported for relocation to be effective, habitat modification and harassment were necessary at the original site. Translocation of wildlife is also discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats (Nielsen 1988).

Vultures are trapped in large corral traps baited with animal carcasses, fish, or animal parts when large numbers must be captured. The trapping process may attract more vultures than originally located in the area. Trapping and relocation of vultures may temporarily exacerbate vulture damage locally.

WS trapped and relocated black and turkey vultures in 1997. WS placed numbered patagial wing tags on 41 black and 8 turkey vultures. The trapped vultures were tagged, loaded into turkey crates, and transported to the release site the day of capture. The vultures were released near sunset approximately 17 miles west of the capture site. Some of the black vultures moved to other farms and killed livestock. Others moved to nearby towns and became part of a new roost which that town had to disperse with

harassment methods.

WS received letters and phone calls from County Boards of Supervisors and County Administrators opposing relocation of vultures for two reasons. The two reasons were the county had an ongoing black vulture predation of livestock problem or the county had an urban vulture roost problem, or both problems. The counties opposing relocation were in the Shenandoah Valley, Southwestern, New River Valley, and Southside regions of Virginia.

3.4 Mitigation and Standard Operating Procedures for Vulture Damage Management Techniques

3.4.1 Mitigation in Standard Operating Procedures (SOPs)

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current WS program, nationwide and in Virginia, uses many such mitigation measures and these are discussed in detail in Chapter 5 of the FEIS (USDA 1997). Some key mitigating measures pertinent to the proposed action and alternatives that are incorporated into WS's Standard Operating Procedures include:

- The WS Decision Model thought process which is used to identify effective wildlife damage management strategies and their impacts.
- Reasonable and prudent measures or alternatives are identified through consultation with the FWS and are implemented to avoid impacts to T&E species.
- Research is being conducted to improve VDM methods and strategies so as to increase selectivity for target species, to develop effective nonlethal control methods, and to evaluate nontarget hazards and environmental impacts.

Some additional mitigating factors specific to the proposed program include:

- Management actions would be directed toward localized populations or groups of target species and/or individual offending members of those species. Generalized population suppression across the State, or even across major portions of the state, would not be conducted.
- WS uses VDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1997, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazard to the public is even further reduced.

3.4.2 Additional Mitigation Specific to the Issues

The following is a summary of additional mitigation measures that are specific to the issues listed in Chapter 2 of this document.

3.4.2.1 Effects on Target Species Populations

- VDM activities are directed to resolving bird damage problems by taking action against individual problem birds, or local populations or groups, not by attempting to eradicate populations in the entire area or region.

- WS take is monitored by comparing numbers of birds killed with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of native species populations (See Chapter 4).

3.4.2.2 Effects on Nontarget Species Populations Including T&E Species

- WS personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding nontargets.
- Observations of birds are made to determine if nontarget or T & E species would be at significant risk from VDM activities.
- WS has consulted with the FWS regarding potential impacts of control methods on T&E species, and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that consultation. For the full context of the Biological Opinion see the ADC FEIS, Appendix F (USDA 1997). Further consultation on species not covered by or included in that consultation process has determined that the vulture damage management program would have *no effect* on threatened or endangered species listed in Virginia.

3.4.2.3 Effects on Human Health and Safety

- WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards.
- WS employees are trained in the safe use of pyrotechnics and lasers.

3.2.2.4 Effects on Aesthetics

- Vultures will be euthanized out of public view to the extent possible.

3.2.2.5 Humaneness and Animal Welfare Concerns of Lethal Methods Used by WS

- Captured non-target animals would be released unless it is determined by the Virginia WS personnel that the animal would not survive.
- Captured vultures would be euthanized by methods recommended by the AVMA (Andrews et al. 1993) or the recommendations of a veterinarian.
- Padded jaw leghold traps would be used if leghold traps were used to capture vultures.
- Adequate water will be provided to vultures captured in decoy traps.

4.0 CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. The chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of each alternative in comparison with the no action alternative to determine if the real or potential impacts would be greater, lesser, or the same. Therefore, the no action alternative serves as the baseline for the analysis and the comparison of expected impacts among the alternatives.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, floodplains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

Cumulative Impacts: Discussed in relationship to each of the potentially affected species analyzed in this chapter.

Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Impacts on sites or resources protected under the National Historic Preservation Act: WS VDM actions are not undertakings that could adversely affect historic resources (See Section 1.8.2.4).

4.1 Environmental Consequences for Issues Analyzed in Detail

4.1.1 Effects on Target Species Bird Populations

4.1.1.1 Alternative 1. - IWDM VDM Program (Proposed Action/No Action)

Analysis of this issue is limited to vultures killed during WS VDM. The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997). Magnitude is described in USDA (1997) as " . . . a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage.

Biology and Ecology of vultures

Two species of vultures are present in Virginia: turkey vulture (Cathartes aura) and black vulture (Coragyps atratus). Vultures are in the family Cathartidae and are related to storks and egrets.

Biology

Turkey vultures are large dark brown birds with wing spans up to six feet and weigh about four pounds (NWRC, unpublished data). Distinguishing characteristics of turkey vultures are a bright red head on adults, the leading edge on the underside of the wing is black while the trailing edge is gray, and the long tail extends well beyond the body when in flight (Peterson 1980). Turkey vultures have been reported to live to 16 years of age (Henny 1990). In contrast, black vultures have less than a five foot wing span and average 4.6 pounds in weight (NWRC, unpublished data)(Peterson 1980). Adult and juvenile black vultures have dark grey heads, the body is black, the underside of the wings are dark grey to blackish with white splotches at the end of the wing, and the tail is relatively short (Peterson 1980) giving the appearance of a large bat when flying. Black vultures have been reported to live to 25 years of age (Henny 1990). The mode of flight between black and turkey vultures differ due to different wing lengths supporting about the same body weight (Rabenhold and Decker 1989). Turkey vultures flap the wings a few times and glide

when at low altitudes, whereas black vultures must flap constantly interspersed with brief glides when at low altitudes unless a strong wind blows. At high altitudes both vultures fly by primarily gliding and riding thermal wind currents.

Black and turkey vultures generally lay 2 eggs which are incubated for approximately 40 days (McHargue 1981). The young are fed and cared for by the adults for two to three months before fledgling (Jackson 1983). A post fledgling dependency period where adults lead young to food may exist for vultures (Rabenhold 1987, Jackson 1983). It is believed that vultures nest annually.

Ecology

Turkey and black vultures are obligate scavengers (Rea 1983, Coleman and Fraser 1987). The diet consists of carrion, fish, and invertebrates (Rea 1983, Rabenhold 1987, Coleman and Fraser 1987). However, black vultures will kill other animals and tear the animals apart for food (Roads 1936, McIlhenny 1939, Sprunt 1946, Lovell 1947, 1952, Parmalee 1954, Mrovsovsky 1971, Lowney 1999).

Vultures roost in communal roosts, especially during late fall through early spring since this behavior enhances the ability to find food. Roosts may number as few as 15 birds to over 1,000 (Prather et al. 1976, Lowney and Eggborn, unpublished data, J. Fraser, VPI & SU, pers. commun).

In North America, black vultures occur in the southeastern United States, Texas, Mexico, and parts of Arizona (Wilbur 1983). Black vultures have been expanding their range northward in the eastern United States (Wilbur 1983, Rabenhold and Decker 1989). J. Bucknall (USDA, pers. commun.) reported black vultures living in New Jersey and Pennsylvania in 1995. Black vultures are considered locally resident (Parmalee and Parmalee 1967, Rabenhold and Decker 1989), however some populations will migrate (Eisenmann 1963 cited from Wilbur 1983). Turkey vultures occur in all of Mexico, most of the United States, and in the southern tier of Canada (Wilbur 1983, Rabenhold and Decker 1989). Also, turkey vultures continue to expand their range into the northeastern United States (Wilbur 1983). Northern populations of turkey vultures migrate from summer to more southern wintering areas (Stewart 1977).

Vulture densities in Virginia

Population Status

The population status of black and turkey vultures has been in dispute because of debate over sampling procedures. Blem (1995) and Brown (1976) believe black and turkey vultures have been declining in abundance based on Christmas Bird Counts. Whereas, Peterjohn and Sauer (1993) report a statistically significant population increase for black vultures and a stable population for turkey vultures during the period 1966 through 1991 from Breeding Bird Survey Data collected by the U.S. Fish and Wildlife Service. Wilbur (1983) cautioned against drawing conclusion regarding the status of vultures until more precise data was collected. Furthermore, Rabenhold and Decker (1989) point out that Christmas Bird Counts (CBC) under-represent black vulture abundance due to mode of flight. Moreover, Sweeney and Fraser (1986) report Christmas Bird Counts as an inappropriate method for surveying vultures. Sweeney and Fraser (1986) report the most appropriate way to survey vulture abundance was counting at the roost.

Analysis of more recent CBC data suggests the opposite, however. Based on 23 CBC sites in Virginia where counts have been performed annually since 1988, both turkey and black vultures

display statistically significant increasing population trends. During the 13-year period 1988-2000, counts of black vultures have increased 3-fold while counts of turkey vultures have more than doubled. The CBC provides an indication of population trends, not an estimate of actual populations levels. When used properly, CBC data can reveal important changes in the status of a species' population across a broad area that would otherwise be undetectable. Counts at individual roosts can reveal the status of local populations, but roost counting lacks the consistent, long term, broad geographical coverage of the CBC. Sweeney and Fraser (1986) described the CBC as inappropriate for monitoring vulture populations because they found only weak correlations between roost counts and nearby roadside surveys. This is not a surprising result, however, because after vultures depart a roost, they can disperse over a broad area, and there is no reason to expect a strong correlation between the number of birds departing a roost in early morning and the number counted during a roadside survey conducted hours later. A count at a roost is a point count whereas a survey along a road transect potentially includes birds from multiple roosts over a broad area. Furthermore, there currently is no systematic survey of vulture roosts in Virginia or in any other state. Thus, despite possible shortcomings, and imperfections, the CBC data remains the best source of information on statewide vulture population trends.

WS and VDACS counted vultures at roost sites across Virginia during winter 1996 and 1997. The actual number of roosts in a county or region is unknown due to the difficulty in locating vulture roosts unless they become a problem. They counted 2,830 black vultures and 2,478 turkey vultures in 62 roosts in 1997 and 1,553 black vultures and 2,448 turkey vultures in 56 roosts in 1996. Vultures interchange among roost sites and among other vultures moving among roosts in a local area (Rabenhold 1986, Sweeney and Fraser 1986). In Loudoun County three roosts were counted in 1996 and two roosts in 1997 (Table 4-1). There were 5 roosts in Loudoun County in 1997, but WS and VDACS could only find 1 (Leesburg) until informed about the location of other roosts.

Table 4-1. Number of vultures reported roosting at roost sites in Loudoun County as reported and counted by the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services and Virginia Department of Agriculture and Consumer Services during statewide vulture roost surveys.

<u>Location</u>	<u>Year</u>	<u>Number of turkey vultures</u>	<u>Number of black vultures</u>
Loudoun County (site 54)	1997	183	45
Loudoun County (site 77)	1997	2	-
Loudoun County (site 42)	1996	100	60
Loudoun County (site 54)	1996	155	90
Loudoun County (site 77)	1996	-	17

A quantitative determination of vulture populations in Virginia was not used in the following analyses due to the above described inability to accurately census and sample vulture populations and that VDGIF was unable to provided information on population trends and any definitive estimates of population sizes for purposes of the following analyses on impacts to the population. Therefore, WS used the best available information to produce reasonable estimates from the United States Geological Survey, Biological Survey "Breeding Bird Survey" and Audubon Society's "Christmas Bird Counts". A qualitative determination of vulture population trends in Virginia, the number of vulture damage complaints for the past 10 years (1991-2001) and an overall reported increase in vulture populations in continental North America, were used to

determine possible impacts each of the alternatives may have on the overall vulture population in the State.

Black and turkey vulture breeding populations in continental North America have increased annually at rates of 2.7% and 1.3%, respectively, from 1966-2000 (Sauer et al. 2001). A closer analysis of the data shows black vultures increased 9.7 percent annually from 1980 through 2000, a 4-fold increase (Sauer et al. 2001)(Fig. 4-1). While turkey vultures increased 1.7 percent annually from 1980 through 2000, a 2-fold increase (Sauer et al. 2001)(Fig. 4-2). Christmas Bird Count data, which shows trends for populations of vultures wintering in Virginia shows black vultures and turkey vultures increased nearly two fold from 1991 through 2001 (Fig. 4-3).

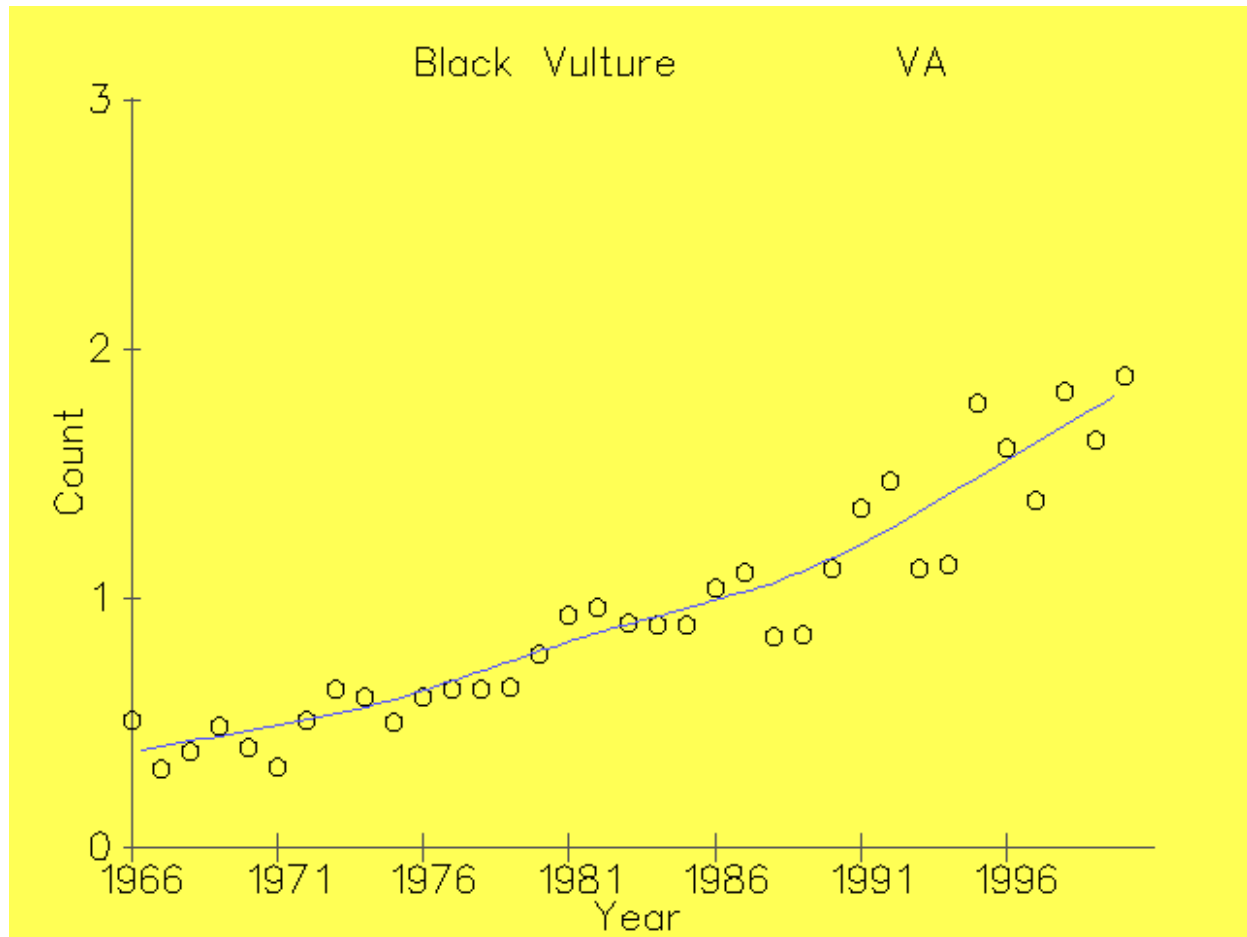
Damage complaints increased from 2 in 1990 to 207 in 1995, with a decline in 1996 (Lowney 1999). Lowney (1999) attributed part of the decline in reports of vulture damage in 1996 to the occurrence of major snowstorms. The number of vulture damage complaints then continued an increasing trend to 174 in 2001 (Table 1-1). The increase in damage during 1990-1995 is most likely attributed to increases in the black vulture population or reporting by citizens (Lowney 1999). The growth in black vulture population from 1980 - 2000, partially explains the increase in reported damage (Sauer et al. 2001). Additionally, the number of reports of damage increased as livestock producers and the general public learned where to seek assistance (Lowney 1999). Vulture complaints were reported statewide from 1994 - 1996, but complaints through the State were unevenly distributed with 38% of the reported complaints from the Southern Piedmont, 24% from Southwestern Ridge and Valley, 20% from Coastal Plain, 13% from Northern Piedmont, and 5% from the Shenandoah Valley physiographic regions (Lowney 1999). Damage was reported in 55 counties and 2 independent cities from 1994 to 1996 (Lowney 1999).

WS's activities in resolving vulture damage have been more nonlethal than lethal. For example, for the 5-year period from FY 1997 through 2001, WS personnel killed 292 vultures while the number dispersed by use of harassment with pyrotechnics totaled an estimated 6,474 (Table 3-1).

Private landowners and land managers may obtain migratory bird depredation permits from the FWS to take vultures (50 Code of Federal Regulations, Part 21.41) as part of an integrated vulture damage management program (Table 4-2). Many landowners and land managers obtain permits initially and then stop renewing the permits because they believe the permit process is burdensome (Lowney 1999). Thus the number of permits issued annually fails to show the magnitude of the vulture damage problem. Also, many people with vulture damage report they have few neighbors who would report them to law enforcement authorities thus will not apply for a permit.

Table 4-2. Migratory bird depredation permits issued by the United States Department of Interior, Fish and Wildlife Service to alleviate vulture damage in Virginia, 1999 - 2001.

Year	Number of permits recommended ¹	Number of permits issued	Authorized Take ²		Reported Take ³	
			Black vultures	Turkey	Black vultures	Turkey
			<u>vultures</u>		<u>vultures</u>	
2001	48	25	731	564	167	114
2000	36	19	649	395	106	36
1999	26	12	145	5	n/a	n/a



1. Recommendations for permits are made by the United States Department of Agriculture, Wildlife Services.
2. Data in 2001 and 200 is from the United States Department of Interior, Fish and Wildlife Service. Data in 1999 is from the United States Department of Agriculture, Wildlife Services records.
3. The actual take usually is significantly less than the permitted take (Coon et al. 1996, Belant et al. 2000).

Figure 4-1. Population trend of black vultures in Virginia. Data is from Sauer et al. 2001.

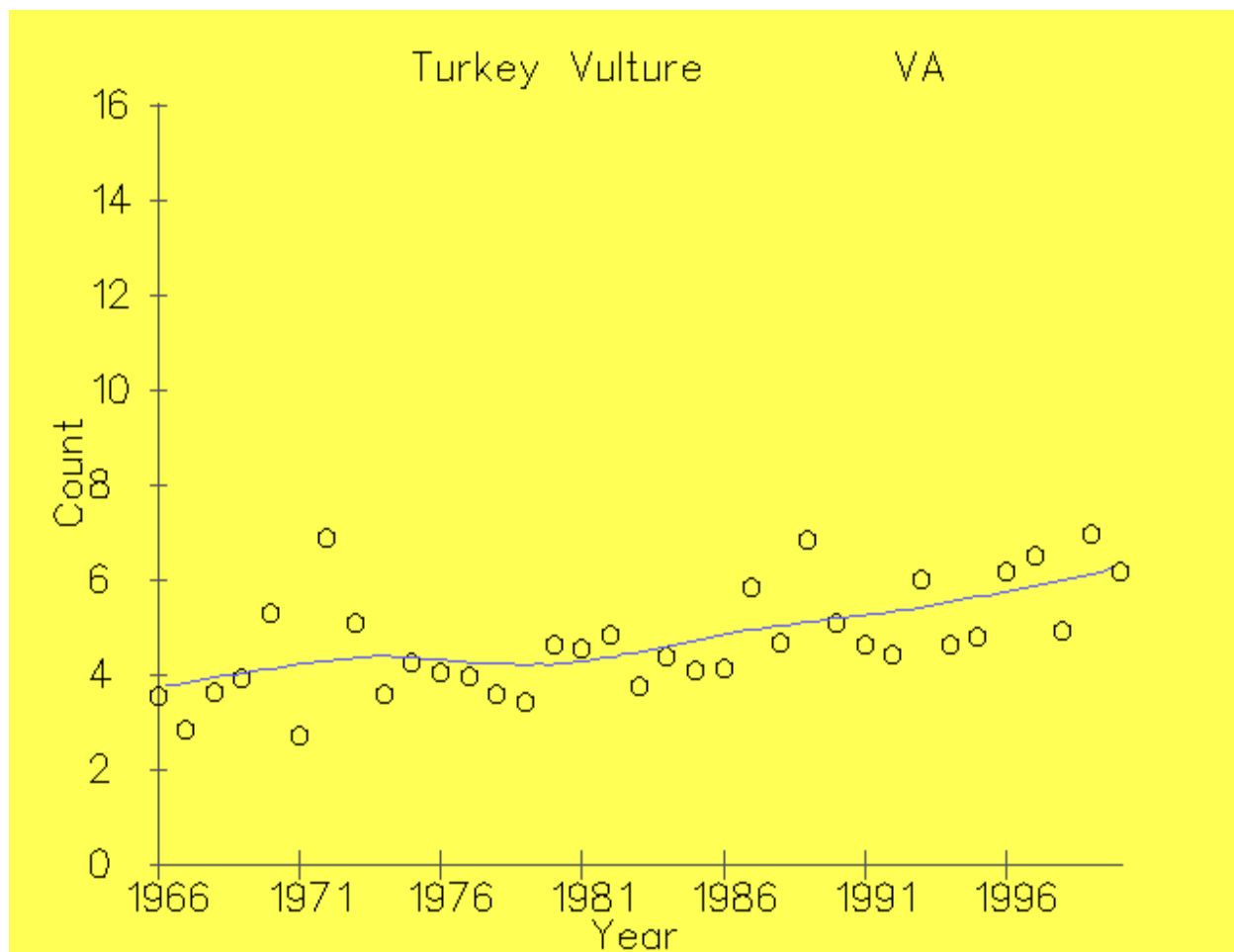


Figure 4-2. Population trend of turkey vultures in Virginia. Data is from Sauer et al. 2001.

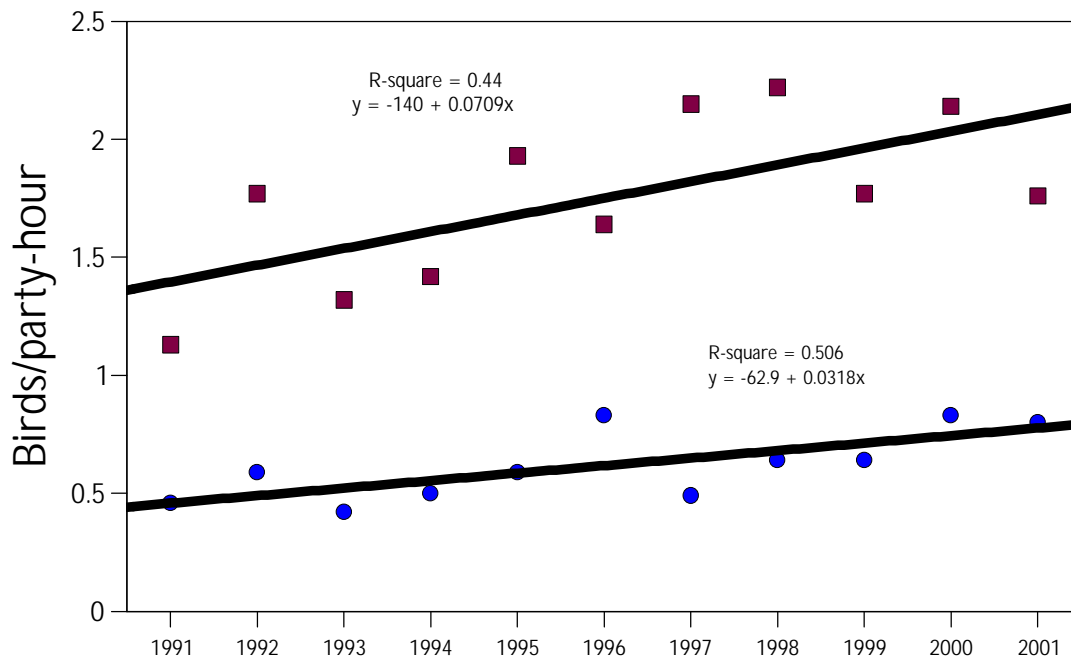


Figure 4-3. Number of black vultures (circles) and turkey vultures (squares) recorded on annual Christmas Bird Counts in Virginia, 1991 - 2001, adjusted for observer effort.

Vulture population impact analysis

WS lethally removed 292 vultures as part of their VDM program from 1997 to 2001 (Table 3-1). Based upon an anticipated increase in requests for WS VDM assistance, WS expects to take no more than 1,500 turkey vultures and 2,500 black vultures each year under the proposed action. Vultures are removed under depredation permits issued by the FWS. The FWS is the regulating authority for monitoring and managing vulture populations in the United States and Virginia, respectively, and have the authority to limit the number of vultures taken under depredation permits. The USGS, Biological Survey is the management authority for monitoring population trends of some migratory birds. Vultures are removed to re-enforce non-lethal VDM methods and to reduce vulture populations in site specific areas only when needed to reduce damage, thus only a minimal number of vultures are removed in a given area.

It is likely that some of the vultures killed by WS would be killed anyway by private individuals permitted under the authority of the FWS since they were depredating animals. It is possible that some of these vultures would be taken illegally by some landowners without permits. There is also the strong possibility that even more vultures would be killed in the absence of WS involvement since landowners or other private entities would tend to be less selective for depredating vultures than experienced WS personnel and might therefore kill more non-offending vultures in attempts to stop depredation problems. An example would be an untrained individual misidentifying a turkey vulture for a depredating black vulture, which is the species

responsible for livestock depredation in Virginia (Lowney 1999).

Based upon BBS and CBC data, WS has not impacted vulture populations in Virginia (Fig. 4-1, 4-2, and 4-3). Furthermore, WS expects that its anticipated vulture take would not adversely impact vulture populations given the current FWS permitted take and suspected illegal take, and the vultures populations growth over the last 20 years. The FWS, as the agency with management responsibility, could impose restrictions on depredation harvest as needed to assure cumulative take does not adversely affect the continued viability of populations. The FWS requires all FWS depredation permit holders to annually report the number of vultures taken under these permits. This should assure that cumulative impacts on vulture population would have no significant adverse impact on the quality of the human environment. Furthermore, based on trends from damage complaints and the fact that continental North American vulture populations are slightly increasing or increasing, it is unlikely that WS VDM practices will significantly cause adverse affects to vulture populations within a region of the state, statewide, regional or continental scale. WS would review available vulture population information on an annual basis to further ensure that the proposed VDM program does not adversely affect vulture populations.

4.1.1.2 Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, WS would not take any target species because no lethal methods would be used by WS and only nonlethal technical assistance recommendations would be made. Although WS take of target bird species would not occur, it is likely that, without WS conducting some level of lethal VDM activities, private VDM efforts would increase, leading to potentially similar or even greater cumulative impacts on target species populations than those of the proposed program alternative. For the same reasons shown in the population impacts analysis in section 4.1.1.1, it is unlikely that target bird populations would be impacted significantly by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce losses to acceptable levels could lead to illegal use of other chemicals which could lead to real but unknown impacts on target bird populations. Illegal use of chemicals (parathion) on black vultures occurred in Botetourt County, Virginia in 1997 which resulted in the death of 18 vultures (Holt 1998). Impacts and hypothetical risks of illegal chemical toxicant use under this alternative would probably be greater than the proposed action, about the same as Alternative 3 and 4, but less than under Alternative 5. Vultures roosts sometimes will not disperse when only nonlethal methods are used. Therefore the harassment program may persist for months to provide some temporary relief or to create the appearance government agencies are trying to provide meaningful assistance to residents.

4.1.1.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would have no impact on target species populations in the State because the program would not conduct any operational VDM activities but would be limited to providing advice only. Private efforts to reduce or prevent vulture damage and perceived disease transmission risks could increase which could result in similar or even greater impacts on those populations than the proposed program alternative. For the same reasons shown in the population impacts analysis in section 4.1.1.1, it is unlikely that target bird populations would be impacted significantly by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of other chemicals which could lead to real but unknown impacts on target bird populations. Illegal use of chemicals on vultures occurred in Botetourt County, Virginia in 1997 which resulted in the death of 18 black vultures (Holt 1998). They were poisoned with parathion, an insecticide (Holt

1998). Impacts and hypothetical risks of illegal chemical toxicant use under this alternative would probably be about the same as those under Alternative 2.

4.1.1.4 Alternative 4 - Lethal VDM Only by WS

Under this alternative, WS would likely have a greater impact on the target species population in the State than Alternative 1 (Proposed Action/No Action). Only lethal VDM activities would be implemented to resolve vulture damage in all situations. WS would not recommended or use any non-lethal VDM activities to reduce vulture damage within Virginia. It is likely that a greater number of vultures would likely have to be removed lethally to attempt to achieve the same results as the proposed action. For the same reasons shown in the population impacts analysis in section 4.1.1.1, it is unlikely that target bird populations would be impacted significantly by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce losses to acceptable levels could lead to illegal use of other chemicals which could lead to real but unknown impacts on target bird populations. Illegal use of chemicals (parathion) on black vultures occurred in Botetourt County, Virginia in 1997 which resulted in the death of 18 vultures (Holt 1998). Impacts and hypothetical risks of illegal chemical toxicant use under this alternative would probably be less than those under Alternative 2 and 3 since WS would be removing vultures causing damage or are a health or safety concern.

4.1.1.5 Alternative 5 - No Federal WS VDM (No Action)

Under this alternative, WS would have no impact on target species populations in the State. Private efforts to reduce or prevent depredations could increase which could result in impacts on target species populations to an unknown degree. Impacts on target species under this alternative could be the same, less, or more than those of the proposed action depending on the level of effort expended by private persons. For the same reasons shown in the population impacts analysis in section 4.1.1.1 it is unlikely that target bird populations would be impacted significantly by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of other chemicals which could lead to real but unknown impacts on target bird populations.

4.1.2 Effects on Nontarget Species Populations, including Threatened and Endangered Species.

4.1.2.1 Alternative 1 - IWDM VDM Program (Proposed Action/No Action)

Adverse Impacts on Nontarget (non-T&E) Species. WS has taken no nontarget species during VDM activities. While every precaution is taken to safeguard against taking nontarget birds, it is possible that crows or other scavenging birds may be captured in baited panel traps resulting in the incidental take of unintended species. These nontarget birds would be released alive and unharmed. These occurrences are rare, have not occurred in Virginia, and should not affect the overall populations of any species under the proposed program.

Birds other than vultures may be scared by harassment programs to disperse vulture roosts. These birds may seek cover or flee during the harassment program (e.g., lasers, pyrotechnics, sirens, propane cannons). The impact will be short term as the bird would return to their normal activities once the harassment program ends for the evening. Harassment programs to disperse vulture roost normally occur for the last 30 - 90 minutes of the day.

Beneficial Impacts on Nontarget Species.

Locations used as vulture roost tend to have few other birds. The dispersal of a vulture roost would benefit other migratory birds which would use that habitat.

T&E Species Impacts. T&E species that are federally listed (or proposed for listing) for the State of Virginia are:

Gray bat, Indiana bat, Virginia big-eared bat, Cumberland bean, purple bean, green blossom pearlymussel, slender chub, spotfin chub, Cumberlandian combshell, duskytail darter, bald eagle, fanshell, Lee County cave isopod, Madison Cave Isopod, Roanoke logperch, yellowfin madtom, West Indian manatee, Appalachian monkeyface, Cumberland monkeyface, pink mucket, oyster mussel, birdwing pearlymussel, crackling pearlymussel, dromedary pearlymussel, littlewing pearlymussel, finereyed pigtoe, rough pigtoe, shiny pigtoe, piping plover, eastern puma, rough rabbitsfoot, tan riffleshell, Shenandoah salamander, green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, Virginia fringed mountain snail, James spineymussel, Delmarva peninsula fox squirrel, Virginia northern flying squirrel, shortnose sturgeon, roseate tern, northeastern beach tiger beetle, bog turtle, dwarf wedgemussel, finback whale, humpback whale, right whale, red-cockaded woodpecker, sensitive joint-vetch, shale barren rock-cress, Virginia round leaf birch, small anthered bittercress, smooth coneflower, Virginia sneezeweed, swamp pink, Peter's Mountain mallow, small whorled pogonia, eastern prairie fringed orchid, Michaux's sumac, northeastern bulrush, and Virginia spiraea.

WS has determined that the proposed WS VDM would have no effect on any of the above listed birds, mammals, invertebrates, fish, reptiles, amphibians, or plants or their critical habitats.

The 1992 Biological Opinion (B.O.) from the FWS concluded that the bald eagle would not be adversely affected by any aspect of the WS program which included all methods of VDM described herein (USDA 1997, Appendix F).

Mitigation measures to avoid T&E impacts were described in Chapter 3 (section 3.4.2.2). Those measures and characteristics should assure there would be no jeopardy to T&E species or adverse impacts on mammalian or non-T&E bird scavengers from the proposed action. None of the other control methods described in the proposed action alternative pose any hazard to nontarget or T&E species.

4.1.2.2 Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, WS take of nontarget animals would be less than that of the proposed action because no lethal control actions would be taken by WS. However, parties whose vulture damage problems were not effectively resolved by nonlethal control methods and recommendations would likely resort to other means of lethal control such as use of shooting by private persons or illegal use of chemical toxicants. This could result in less experienced persons implementing control methods and could lead to greater take of nontarget wildlife than the proposed action. For example, shooting by persons not proficient at bird identification could lead to killing of nontarget birds. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants which could lead to unknown impacts on local nontarget species populations, including T&E species. The illegal use of chemicals on vultures has occurred in Virginia (Holt 1998).

4.1.2.3 Alternative 3 - Technical Assistance Only

Alternative 3 would not allow any WS direct operational VDM in the state. There would be no impact on nontarget or T&E species by WS activities from this alternative. Technical assistance or self-help information would be provided at the request of producers and others. Although technical support might lead to more selective use of lethal control methods by private parties than that which might occur under Alternative 2, private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods leading to greater take of nontarget wildlife than under the proposed action. It is hypothetically possible that, similar to but probably less than under Alternative 2, frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants which could lead to unknown impacts on local nontarget species populations, including some T&E species. Adverse impacts under this alternative would therefore likely be greater than the proposed action, but slightly less than Alternative 2 and 4.

4.1.2.4 Alternative 4 - Lethal VDM Only by WS

Under this alternative, only lethal VDM activities would be recommended and implemented to resolve vulture damage in all situations. WS would not recommended or use any non-lethal VDM activities to reduce vulture damage within Virginia. WS take of nontargets would not differ substantially from the proposed program described in section 4.1.2.1. Although technical support, similar to Alternative 3, might lead to more selective use of lethal control methods by private parties than that which might occur under Alternative 2, private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods leading to greater take of nontarget wildlife than under the proposed action. It is hypothetically possible that, similar to but probably less than under Alternative 2, frustration caused by the inability to reduce losses to acceptable levels by lethal means could lead to illegal use of chemical toxicants which could lead to unknown impacts on local nontarget species populations, including some T&E species.

4.1.2.5 Alternative 5 - No Federal WS VDM

Alternative 5 would not allow any WS VDM in the State. There would be no impact on nontarget or T&E species by WS VDM activities from this alternative. However, private efforts to reduce or prevent depredations could increase which could result in less experienced persons implementing control methods and could lead to greater take of nontarget wildlife than under the proposed action. For example, shooting by persons not proficient at bird identification could lead to killing of nontarget birds. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants which could impact local nontarget species populations, including some T&E species. Illegal use of chemicals (parathion) on black vultures occurred in Virginia in 1997 which resulted in the death of 18 vultures (Holt 1998).

4.1.3 Effects on Human Health and Safety

4.1.3.1 Impacts on human safety of VDM methods by Alternative

Alternative 1 - IWDM VDM Program (Proposed Action/No Action)

VDM methods that might raise safety concerns include shooting with firearms and harassment with pyrotechnics and lasers. Firearms are only used by WS personnel who are experienced in handling and using them. WS personnel receive safety training on a periodic basis to keep them aware of safety concerns. The VA WS program has had no accidents involving the use of firearms or pyrotechnics in which any person was harmed. WS employees have only recently

started using lasers designed for harassing birds. A formal risk assessment of WS's operational management methods (except lasers) found that risks to human safety were low (USDA 1997, Appendix P). Therefore, no significant impacts on human safety from WS's use of these methods is expected. Technical advice could be provided to private individuals in the safe and proper use of VDM control devices. This would likely reduce human safety risks somewhat when WS's advice is utilized, but some VDM activities will continue without WS's technical advice resulting in an increase risk to human safety, although not to the point that they would be significant.

Lasers are available with a power of 5 mW (moderate power) and 68 mW (low power). The difference between the lasers is beam intensity and diameter (Glahn et al. 2000). The lasers do not appear to present any detectable ocular hazards to cormorants but do present human safety concerns (Glahn et al. 2000). Both the Desman and Dissuader laser devices which would be used by Wildlife Services to disperse birds are classified as Class-IIIB lasers (OSHA 1991). Lasers in lower ranges of Class-IIIB do not produce hazardous diffuse reflection unless someone intentionally stares at the laser closer to the diffuser (Glahn and Blackwell undated). The Dissuader is eye safe at the aperture for 1/4 second exposure (Dennis et al. 1999). The lasers can cause temporary flash blindness, afterimage, and glare in people (Glahn and Blackwell, undated). Dennis et al. (1999) report the Dissuader as an excellent glare source at night for tagging people. It is recommended that lasers not be pointed at people (Glahn et al. 2000). These lasers cost \$5,700 to \$7,500 each and this may be a disadvantage (Glahn et al. 2000). A modified Avian Dissuader™ became available in 2001 for \$850.

The Avian Dissuader laser had several new safety features to improve human safety incorporated in 2001. The new safety features include an integral key-lock, trigger "safety", a mechanical safety in the form of a trigger safety pin located on the side of the unit, an audible/visual laser "on" indicator, and a 3-second emission delay for maximum safety.

Some members of the public may be concerned about the safety of shooting vultures with shotguns in urban/suburban locations because of falling shot. Their concern would be about people and property being struck by shot and being injured or damaged. WS employees would shoot vultures loafing on tree limbs by approaching the vultures within 40 yards and shooting up at one vulture at a time which ensures most of the shot is absorbed by the vulture and tree. Lead and steel bird shot used to shoot vultures loses its velocity quickly and therefore loses its energy to cause harm (Table 4-3). The small bird shot used would fall with a force similar to rain and is unlikely to cause any harm (O'Connor 1978). Since WS targets sitting vultures, shoots directly up, uses small shot, most shot is absorbed by the vulture or tree, the small quantity of shot missing the vulture and tree loses its energy quickly, and thus it is unlikely any falling shot would cause harm.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Some members of the public may be concerned about the use of foothold traps catching people. The traps are set on roofs of buildings thus it is highly unlikely the general public would come into contact with these traps. Also, the building owner or manager who requested WS assistance

would be informed about the traps and would sign an Agreement for Control or other document granting permission to WS to use foothold traps. Finally, signs would be posted warning people that traps are set in the area. This method may reduce damage to property and threats to human health or safety when other methods are ineffective or impractical.

Table 4-3. Velocity (feet per second) of lead and steel shot over distances. Data provided by Federal Cartridge Corporation and Winchester Ammunition. Range is for shotgun fired at 45° angle into air.

<u>Shot</u>	Pellet Diameter (inches)	Number of pellets/oz	<u>Range (yards)</u>					<u>Maximum range of shot before falling</u>
			<u>0</u>	<u>50</u>	<u>100</u>	<u>200</u>	<u>300</u>	
2 lead	.15	90	1280	687	399	134	83	312
4 lead	.13	135	1400	672	362	105	-	284
6 lead	.11	225	1400	633	299	75	-	250
1 steel	.16	103	1450	672	347	92	-	271
2 steel	.15	125	1450	644	320	80	-	258
4 steel	.13	191	1450	590	264	64	-	231

Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, WS would not use firearms for lethal control during VDM but would still be able to use them as a harassment method. Pyrotechnics and lasers would also be used by WS. Risks to human safety from WS's use of firearms, lasers, and pyrotechnics would be similar to those described under Alternative 1. Technical advice would be provided to private individuals in the safe and proper use of nonlethal control devices. However, increased use of firearms, both as a lethal and a nonlethal VDM device, by less experienced and trained private individuals, would probably occur due to the sometimes ineffectiveness of nonlethal methods when they are used alone. This would likely increase human safety risks somewhat, although not to the point that they would be significant.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not engage in direct operational use of any VDM method. Risks to human safety from WS's use of firearms and pyrotechnics would be lower than the proposed program alternative, but not significantly because VA WS's program has an excellent safety record in which no accidents involving the use of these devices have occurred that have resulted in a member of the public being harmed. Technical advice would be provided to private

individuals in the safe and proper use of VDM control devices. However, increased use of firearms, both as a lethal and a nonlethal VDM device, and pyrotechnics by less experienced and trained private individuals would probably occur without WS direct operational assistance, which would likely increase human safety risks somewhat. These risks would likely be less than Alternative 5 because some private parties would be receiving advice and instruction from WS.

Alternative 4 - Lethal VDM Only by WS

Under this alternative, only lethal VDM activities would be implemented to resolve vulture damage in all situations. WS would not recommended or use any non-lethal VDM activities to reduce vulture damage within Virginia. WS's use of lethal VDM methods, the use of firearms and traps, would not differ substantially from the proposed program described in Alternative 1. Although technical support, similar to Alternative 3, might lead to more selective use of lethal control methods by private parties than that which might occur under Alternative 2, private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods.

Alternative 5 - No Federal WS VDM

Under this alternative, WS would not engage in or recommend use of any VDM methods. Risks to human safety from WS's use of firearms, traps, lasers, and pyrotechnics would be alleviated because no such use would occur. However, increased use of firearms and pyrotechnics by less experienced and trained private individuals would probably occur without WS assistance. WS would not provided assistance to private individuals in the safe and proper use of VDM control devices. Risks to human safety would probably increase under this alternative, although not to the point that they would be significant.

4.1.3.2 Impacts on human safety of not conducting VDM to reduce disease outbreaks and bird strike hazards at airports

Alternative 1 - IWDM VDM Program (Proposed Action)

As discussed in Chapter 1, vultures can present a bird aircraft strike hazard at airports and carry diseases that are transmittable to humans and that can adversely affect human health. In many cases, it is difficult to conclusively prove that birds were responsible for transmission of individual human cases or outbreaks of bird-borne diseases. Nonetheless, certain requesters of VDM service may consider this risk to be unacceptable and may request such service primarily for that reason. VDM, either by lethal or nonlethal means, would, if successful, reduce the risk of bird aircraft strikes and bird-borne disease transmission at the site for which VDM is requested. This alternative has the greatest possibility of successfully reducing impacts to human health and safety since all VDM methods could possibly be implemented and recommended by WS. An example would be in a situation such as those involving urban vulture populations, the implementation of nonlethal controls such as harassment methods could actually increase the risk of human health and safety problems at other sites by causing the birds to move to other urban roosting sites not previously affected. In such cases, lethal removal of the birds may actually be the best alternative from the standpoint of overall human health and safety concerns in the local area. By having the option of using lethal control methods where nonlethal methods would likely not be successful, the risks to human health and safety are reduced not only at the vulture damage site but also in the surrounding area.

Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, WS would be restricted to implementing and recommending only nonlethal methods in providing assistance with vulture damage problems. Impacts would likely be greater under this alternative than the proposed action when nonlethal methods were ineffective at reducing damage to acceptable levels. Entities requesting VDM assistance for human health and safety concerns would only be provided information on husbandry practices, habitat alteration, or other nonlethal methods such as harassment. Because some of these nonlethal methods would likely only be effective at the individual sites where they are used, this alternative could create or increase human health and safety risks at other locations to where the birds would then move. Some requesting entities such as city government officials would reject WS assistance for this reason and would likely seek to achieve bird control by other means. In such cases, human health and safety risks may remain the same or become worse. Also, under this alternative, human health and safety problems would probably increase if private individuals were unwilling to implement nonlethal control methods because of high cost or lack of faith in their effectiveness, or if they were unable to hire other entities to conduct effective VDM for human health and safety concerns.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not engage in direct operational use of any VDM method. Only technical advice would be recommended to alleviate vulture damage in all situations. Individuals requesting VDM for human health and safety concerns would either (1) not take any action which means the risk of human health and safety problems would continue or would increase in each situation, (2) implement WS recommendations for nonlethal VDM methods site-by-site, which could result in vultures relocating to other locations possibly creating or increasing human health and safety risks at new sites or nonlethal roost dispersal efforts failing and the health risks continuing, (3) undertake lethal VDM methods themselves, or (4) hire animal control agents to conduct VDM activities. Under this alternative, human health problems could increase if private individuals were unable to achieve effective VDM with technical assistance alone, or if they were unable to hire other entities to conduct effective VDM for human health and safety concerns. Overall impacts to human safety would likely be greater than the proposed action.

Alternative 4 - Lethal VDM Only by WS

Under this alternative, only lethal VDM activities would be implemented or recommended to resolve vulture damage in all situations. All lethal VDM methods would not be available in all situations, such as when local ordinances restrict the discharge of firearms. In these situations WS would not be able to recommend or use some lethal methods that otherwise would be available under the proposed action. If private individuals did not implement their own nonlethal program in this particular situation, the likely results would be vulture damage remaining the same or possibly increasing. Overall impacts on human safety would likely be greater under this alternative than the proposed action.

Alternative 5 - No Federal WS VDM

With no WS assistance, private individuals and community government officials would be responsible for developing and implementing their own VDM program. Impacts on human safety would likely remain the same or be greater under of this alternative than the proposed action, because these parties would either (1) not take any action which means the risk of human health and safety problems would continue or would increase in each situation, (2) implement nonlethal control methods site-by-site, which could result in vultures relocating to other locations possibly

creating or increasing human health and safety risks at new sites, (3) undertake lethal control methods, or (4) hire animal control agents to conduct VDM activities. Under this alternative, human health problems could remain the same or increase if private individuals were unable to find and implement effective means of controlling vultures to an acceptable level.

4.1.4 Effects on Aesthetics

4.1.4.1 Effects on Human Affectionate-Bonds with Individual Birds and on Aesthetic Values of Wild Bird Species

Alternative 1 - IWDM VDM Program (Proposed Action/No Action)

Some people who routinely view individual birds such as vultures would likely be disturbed by removal of such birds under the proposed program. WS is aware of similar concerns and has taken it into consideration in some cases to mitigate other wildlife damage problems.

Some people have expressed opposition to the killing of any vultures during VDM activities. Under the proposed program, some lethal control of birds would occur and these persons would continue to be opposed. However, many persons who voice opposition have no direct connection or opportunity to view or enjoy the particular birds that would be killed by WS's lethal control activities. Lethal control actions would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would therefore continue to remain available for viewing by persons with that interest.

Some people do not believe that vultures or vulture roosts should even be harassed to stop or reduce damage problems. Some people who enjoy viewing vultures would feel their interests are harmed by WS's nonlethal harassment program. Some people believe vultures fill an important ecological role eating dead animals and therefore vultures should not be harassed or taken. Mitigating that impact, however, is the fact that overall numbers of vultures in the area are not diminished by a harassment program and people who like to view these species can still do so on State wildlife management areas, National wildlife refuges, National parks, National forests, as well as numerous private property sites where the owners are not experiencing damage to the birds and are tolerant of their presence.

Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, WS would not conduct any lethal VDM but would still conduct harassment of vultures that were causing damage. Some people who oppose lethal control of wildlife by government but are tolerant of government involvement in nonlethal wildlife damage management would favor this alternative.

Some people believe that vultures or vulture roosts should not be harassed to stop or reduce damage problems. Some people who enjoy viewing vultures or believe vultures' ecological role eating dead animals outweighs any harm to people, would feel their interests are harmed by WS's nonlethal harassment program. Mitigating that impact, however, is the fact that overall numbers of vultures in the area are not diminished by a harassment program and people who like to view these species can still do so on State wildlife management areas, National wildlife refuges, National parks, National forests, as well as numerous private property sites where the owners are not experiencing damage to the birds and are tolerant of their presence.

Persons who have developed affectionate bonds with individual wild birds would not be affected

by WS's activities under this alternative because the individual birds would not be killed by WS. However, other private entities would likely conduct similar VDM activities as those that would no longer be conducted by WS which means the impacts would then be similar to the proposed program alternative.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any direct operational VDM but would still provide technical assistance or self-help advice to persons requesting assistance with vulture damage. Some people who oppose direct operational assistance in wildlife damage management by the government but favor government technical assistance would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS's activities under this alternative because the individual birds would not be killed or harassed by WS. However, other private entities would likely conduct similar VDM activities as those that would no longer be conducted by WS which means the impacts would then be similar to the proposed program alternative.

Alternative 4 - Lethal VDM Only by WS

Under this alternative, only lethal VDM activities would be implemented or recommended. People that have expressed opposition to the killing of any vultures during VDM activities would likely be opposed to this alternative. However, other private entities would likely conduct similar VDM activities as those that would be conducted by WS and also those that are no longer conducted by WS, which means the impacts would then be similar to the proposed program alternative.

Alternative 5 - No Federal WS VDM

Under this alternative, WS would not conduct any lethal or nonlethal VDM activities. Some people who oppose any government involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS's activities under this alternative. However, other private entities would likely conduct similar VDM activities as those that would no longer be conducted by WS, resulting in impacts that would be similar to the proposed program alternative.

4.1.4.2 Effects on Aesthetic Values of Property Damaged by Birds

Alternative 1 - IWDM VDM Program (Proposed Action/No Action)

Under this alternative, WS would provide operational and technical assistance in reducing vulture problems in which fecal droppings from vultures are causing an unsightly mess and would, if successful, improve aesthetic values of affected properties in the view of property owners and managers. This alternative has the greatest possibility of successfully reducing aesthetic damage to property since all VDM methods could possibly be implemented and recommended by WS. Dispersal of nuisance roosting vultures by harassment can sometimes result in the birds causing the same or similar problems at the new location. If WS is providing direct operational assistance in dispersing such bird roosts, coordination with local authorities to monitor the birds' movements is generally conducted to assure they do not reestablish in other undesirable locations.

Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, WS would only provide nonlethal operational and technical assistance in reducing vulture problems in which droppings from vultures are causing a unsightly mess and would, if successful, improve aesthetic values of affected properties in the view of property owners and managers. Dispersal of nuisance roosting vultures by harassment can sometimes result in the birds causing the same or similar problems at the new location. If WS is providing direct operational assistance in relocating such birds, coordination with local authorities to monitor the birds' movements is generally conducted to assure they do not reestablish in other undesirable locations. If nonlethal VDM methods are not effective in reducing vulture problems WS would not be able to recommend or implement any potential successful lethal VDM method. Private individuals would then have the option of doing nothing, which would not reduce the problem, or implement their own control methods, which can have varying success. Overall, impacts of improving aesthetics would be slightly less than the proposed action.

Alternative 3 - Technical Assistance Only

Under this alternative, the lack of operational assistance in reducing nuisance vulture problems would mean aesthetic values of some affected properties would continue to be adversely affected resulting in less of a possibility of improving aesthetic values. The success of improving aesthetic values would be greater than under Alternative 5, this is because some of these property owners would be able to resolve their problems by following WS's technical assistance recommendations. Dispersal of nuisance vultures or vulture roosts through harassment or habitat alteration can sometimes result in the birds causing the same problems at the new location. If WS has only provided technical assistance to local residents or municipal authorities, coordination with local authorities to monitor the birds' movements to assure the birds do not reestablish in other undesirable locations might not be conducted. In such cases, limiting WS to technical assistance only could result in a greater chance of adverse impacts on aesthetics of property owners at other locations than the proposed program alternative.

Alternative 4 - Lethal VDM Only by WS

Under this alternative, only lethal VDM activities would be implemented or recommended. This alternative would result in nuisance vultures being removed by lethal means only. Where lethal VDM could be conducted vulture damage would likely be reduced to acceptable levels. In areas where lethal VDM could not be conducted, such as areas with local ordinances restricting the discharge of firearms, vulture damage may not be reduced. Property owners would be required to develop and implement their own non-lethal VDM programs. Dispersal of nuisance vultures or vulture roosts through harassment or habitat alteration can sometimes result in the birds causing the same problems at the new location. If WS does not provided non-lethal assistance to local residents or municipal authorities, coordination with local authorities to monitor the birds' movements to assure the birds do not reestablish in other undesirable locations might not be conducted. Thus, this alternative could result in more property owners experiencing adverse effects on the aesthetic values of their properties than the proposed program alternative.

Alternative 5 - No Federal WS VDM

Under this alternative, the lack of any WS operational or technical assistance in reducing nuisance problems in which droppings from the birds cause unsightly mess would mean aesthetic values of some affected properties would continue to be adversely affected if the property owners were not able to achieve VDM some other way. In many cases, this type of aesthetic "damage" would worsen because property owners would not be able to resolve their problems and bird numbers would continue to increase resulting in a greater chance of adverse

impacts on aesthetics of property owners than the proposed program alternative.

4.1.5 Humaneness of lethal bird control methods

4.1.5.1 Alternative 1 - IWDM VDM Program (Proposed Action/No Action)

Under this alternative, methods viewed by some persons as inhumane would be used in VDM by WS. These methods would include shooting and live trapping followed by euthanasia. Shooting, when performed by experienced professionals, usually results in a quick death for target birds. Occasionally, however, some birds are initially wounded and must be shot a second time or must be caught by hand and then dispatched or euthanized. Some persons would view shooting as inhumane. Occasionally, birds captured alive by panel or modified padded-jaw foot hold traps, or by hand or with nets would be euthanized. The most common methods of euthanasia would be by cervical dislocation and CO₂ gas which are AVMA-approved euthanasia method (Beaver et al. 2001) . Most people would view AVMA-approved euthanasia methods as humane.

4.1.5.2 Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, lethal methods viewed as inhumane by some persons would not be used by WS. However, it is expected that some requesters of VDM assistance would reject nonlethal methods recommended by WS and/or would not be willing to pay the extra cost of implementing and maintaining them and would seek alternative lethal means resulting in impacts to humaneness similar to the proposed action. Shooting could be used by non-WS entities and, similar to the proposed program alternative, would be viewed by some persons as inhumane. Trapping and capture by other methods and euthanasia gas could be used by these entities resulting in impacts similar to the proposed action. Overall, people who perceive the use of lethal control methods by WS as inhumane would prefer this alternative to the proposed action.

4.1.5.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any operational lethal or nonlethal VDM, but would provide self-help advice only. Lethal methods viewed as inhumane by some persons would not be used by WS, but could be implemented as the preferred VDM method by persons seeking technical advice. Persons receiving technical assistance would have the responsibility of implementing their own VDM programs. Without WS direct operational assistance, it is expected that some requesters of VDM would reject nonlethal recommendations or would not be willing to pay the extra cost of implementing and maintaining them and would disregard WS's nonlethal recommendations and seek alternative lethal VDM methods, which could include shooting, which would be viewed as inhumane by some persons. Trapping and capture by other methods and euthanasia could be used by these entities. Overall, people who perceive the use of lethal control methods by WS as inhumane would prefer this alternative to the proposed action.

4.1.5.4 Alternative 4 - Lethal VDM Only by WS

Under this alternative, only lethal VDM activities would be implemented or recommended. These methods, which would include shooting and live trapping followed by euthanasia. Shooting, when performed by experienced professionals, usually results in a quick death for target birds. Occasionally, however, some birds are initially wounded and must be shot a second time or must be caught by hand and then dispatched or euthanized. Some persons would view shooting as inhumane. Trapping and capture by other methods followed by euthanasia could be used resulting in impacts similar to the proposed action. Overall, persons who view killing of

any kind as inhumane would strongly oppose this alternative. Humanness of lethal VDM under this alternative would likely be similar to the proposed action.

4.1.5.5 Alternative 5 — No Federal WS VDM

Under this alternative, lethal methods viewed as inhumane by some persons would not be used or recommended by WS. Shooting, and live trapping and capture methods followed by euthanasia could be used by non-WS entities and, similar to the proposed program alternative, would be viewed by some persons as inhumane.

Table 4-4 summarizes the expected impacts of each of the alternatives on each of the issues.

4.2 Cumulative Impacts

No significant cumulative environmental impacts are expected from any of the 5 alternatives. Under the Proposed Action and Alternative 4, the lethal removal of vultures would not have a significant impact on overall vulture populations in Virginia or the United States, but some local reductions may occur. Local reductions that may occur would be temporary. This is supported by the VDGIF, which is the agency with responsibility for managing vultures in the State. No risk to public safety is expected when WS's services are provided and accepted by requesting individuals in Alternatives 1 and 4, since only trained and experienced wildlife biologists/specialists would conduct and recommend VDM activities. There is a slight increased risk to public safety when VDM activities are conducted by persons that reject WS assistance and recommendations in Alternatives 1, 2, 3, and 4, and when no WS assistance is provided in Alternative 5. In all 5 Alternatives, however, it would not be to the point that the impacts would be significant. Although some persons will likely be opposed to WS's participation in VDM activities to protect property, livestock, pets, human health and safety, and agricultural resources from vulture damage, the analysis in this EA indicates that WS Integrated VDM program will not result in significant cumulative adverse impacts on the quality of the human environment.

Table 4-4. Relative Comparison of Anticipated Impacts From Alternatives.

Issues/Impacts	Alt. 1 IWDM VDM (Proposed Action/No Action)	Alt. 2 Nonlethal Only	Alt. 3 Technical Assistance (TA) Only	Alt. 4 Lethal Only	Alt. 5 No Federal VDM Program
Target Species Impacts	Low impact - reduction in vulture numbers would not significantly affect species population	Low impact - reductions in vulture numbers would not occur or would be insignificant.	Low impact - reductions in vulture numbers may occur but would be insignificant to populations	Low impact - reductions in vulture numbers would occur but would be insignificant to populations	Low impact - reductions in vulture numbers less likely w/o WS assistance, but would be insignificant to populations if they occurred.
Impacts to Non-target Species	Low impact - methods used by WS would be highly selective with very little risk to nontarget species	Low impact but greater than Alt. 1 - people with vulture problems may resort to less selective lethal methods, if they reject nonlethal methods.	Low impact but greater than Alt. 1, but less than Alt. 2 - people with vulture problems may resort to less selective lethal methods, but less likely with WS TA.	Low impact but greater than Alt. 1 - people with vulture problems may resort to less selective methods, if they reject recommended lethal methods, but less likely than Alt. 2	Low impact but greater than Alts. 1, 2, 3, or 4 - people with vulture problems may resort to less selective lethal methods w/o WS assistance.
Human Health and Safety - Risks of Adverse Effects from VDM Methods	Low risk - methods used by WS would be safe with no probable risk of human health or safety effects.	Low risk but slightly greater than Alt.1 - people with vulture problems may resort to illegal lethal chemicals or methods that pose human/safety risks if they reject nonlethal methods.	Low risk but slightly greater than Alt.1, slightly less than Alt. 2 - people with vulture problems may resort to illegal lethal or chemical methods that pose human health/safety risks; less likely with WS TA.	Low risk but slightly greater than Alt. 1, slightly less than Alt. 2 - people with vulture problems may resort to illegal lethal chemicals or methods that pose human/safety risks if they reject recommended lethal methods.	Low risk but greater than Alts. 1, 2, 3, or 4 - people with vulture problems may resort to illegal chemical or other methods that pose human/safety risks; most likely w/o WS direct or TA assistance.
Human Health and Safety (Disease and avitation threats)- Risks of Adverse Effects from Vulture Damage	Low risk -vulture damage problems most likely to be resolved without creating or moving problems elsewhere.	Low to Moderate risk but greater than Alt. 1 - risks would increase where nonlethal methods would not resolve vulture problems.	Higher risk than Alt. 1, but less than Alt 2 - individuals may be able to resolve vulture problems with TA assistance, but harassment programs would not be coordinated by WS resulting in a greater chance of vultures relocating to new damage sites.	Higher risk than Alt. 1, but similar to Alt. 3 - if unable to resolve vulture problems with lethal methods, individuals would have to implement their own nonlethal harassment program without coordination of the program by WS.	Higher risk than Alts. 1, 2, 3, or 4 - persons with vulture problems might be able to achieve success, but less likely w/o WS direct or TA assistance
Aesthetic Enjoyment of Birds	Low to Moderate impact (at local level only) - WS VDM does not adversely affect overall bird species populations but may be local reductions.	Low impact- vulture numbers at damage sites would remain high or would increase, unless nonlethal recommendations were rejected and vulture numbers were reduced by non-WS personnel	Low to Moderate impact (at local level) - vulture numbers at damage sites would remain high or would increase, unless TA recommendations are implemented successfully.	Low to Moderate impact (at local level only) - WS VDM does not adversely affect overall bird species populations but may be local reductions.	Low impact - vulture numbers at damage sites would remain high or would increase, unless persons are successful in reducing vulture numbers w/o WS direct or TA assistance.

Issues/Impacts	Alt. 1 IWDM VDM (Proposed Action/No Action)	Alt. 2 Nonlethal Only	Alt. 3 Technical Assistance (TA) Only	Alt. 4 Lethal Only	Alt. 5 No Federal VDM Program
Aesthetic Damage by Vultures	Low impact - vulture damage problems most likely to be resolved without creating or moving problems elsewhere.	Low to Moderate impact but greater than Alt. 1 - impacts would increase where nonlethal methods would not resolve vulture problems.	Higher impact than Alt. 1, but less than Alt 2 - individuals may be able to resolve vulture problems with TA assistance, but harassment programs would not be coordinated by WS resulting in a greater chance of vultures relocating to new damage sites.	Higher impact than Alt. 1, but similar to Alt. 3 - if unable to resolve vulture problems with lethal methods, individuals would have to implement their own nonlethal harassment program without coordination of the program by WS.	Higher impact than Alts. 1, 2, 3, or 4 - persons with vulture problems might be able to achieve success, but less likely w/o WS direct or TA assistance
Humaneness of Lethal VDM Methods	Low to Moderate impact - methods viewed by some people as inhumane would be used.	Lower impact than Alt. 1 - but some people with vulture problems may resort to other, less selective lethal methods than those used by WS	Low to Moderate impact, slightly greater than Alt 1 - some people with vulture problems may resort to other, less selective methods, but less likely with WS TA assistance	Low to Moderate impact, similar to Alt. 1, but slightly more than Alt 3 - methods viewed by some people as inhumane would be used.	Low to High impact - humanness of control methods will vary depending upon expertise of individual using VDM methods w/o WS direct or TA assistance

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APPENDIX A

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Appendix B

VULTURE DAMAGE MANAGEMENT (VDM) METHODS AVAILABLE FOR USE OR RECOMMENDATION BY THE VIRGINIA WILDLIFE SERVICES PROGRAM

NONLETHAL METHODS - NONCHEMICAL

Livestock producer and property owner practices. These consist primarily of nonlethal preventive methods such as cultural methods and habitat modification. Cultural methods and other management techniques are implemented by the livestock producer or property owners/managers. Resource owners/managers may be encouraged to use these methods, based on the level of risk, need, and professional judgement on their effectiveness and practicality. These methods include:

Cultural methods. Cultural methods generally involve modifications to the level of care or attention given to livestock which may vary depending on the age and size of the livestock. Animal husbandry practices include but are not limited to techniques such removal of carcasses, indoor birthing of livestock, and closed barns or corrals (Lowney 1999, Johnson and Glahn 1994).

Environmental/Habitat modification can be an integral part of VDM. Wildlife production and/or presence is directly related to the type, quality, and quantity of suitable habitat. Therefore, habitat can be managed to reduce or eliminate the production or attraction of certain bird species or to repel certain birds. In most cases, the resource or property owner is responsible for implementing habitat modifications, and WS only provides advice on the type of modifications that have the best chance of achieving the desired effect. Habitat management is most often a primary component of VDM strategies at or near airports to reduce bird aircraft strike problems by eliminating bird nesting, roosting, loafing, or feeding sites. Generally, many bird problems on airport properties can be minimized through management of food sources, vegetation and water from areas adjacent to aircraft runways (Godin 1994). Habitat management is often necessary to minimize damage caused by vultures that form large roosts during late autumn and winter. Bird activity can be greatly reduced at roost sites by removing all the trees or selectively thinning the stand. Roosts often will re-form at traditional sites, and substantial habitat alteration is sometimes the only way to permanently stop such activity at a site (USDA 1997).

Animal behavior modification. This refers to tactics that alter the behavior of wildlife to reduce damage. Animal behavior modification may involve use of scare tactics or fencing to deter or repel animals that cause loss or damage (Twedt and Glahn 1982). Some but not all methods that are included by this category are:

- Bird-proof barriers
- Electronic guards
- Propane exploders
- Pyrotechnics
- Distress calls and sound producing devices
- Repellents
- Scare crows
- Mylar tape
- Eye-spot balloons
- Lasers
- Effigies (taxidermic mounts, carcasses, and modified plastic goose decoys)
- Shooting to harass

These techniques are generally only practical for small areas. Scaring devices such as distress calls, helium filled eye spot balloons, raptor effigies and silhouettes, mirrors, and moving disks can be effective but usually for only a short time before birds become accustomed and learn to ignore them (Schmidt and Johnson 1984, Bomford 1990, Rossbach 1975, Graves and Andelt 1987, Mott 1985, Shirota and Masake 1983, Conover 1982, Arhart 1972). Mylar tape has produced mixed results in its effectiveness to frighten birds (Dolbeer et al. 1986, Tobin et al. 1988).

Bird proof barriers can be effective but are often cost-prohibitive, particularly because of the aerial mobility of birds which requires overhead barriers as well as peripheral fencing or netting. Exclusion adequate to stop bird movements can also restrict movements of livestock, people and other wildlife (Fuller-Perrine and Tobin 1993). Heavy plastic strips hung vertically in open doorways have been successful in some situations in excluding birds from buildings used for indoor feeding or housing of livestock (Johnson and Glahn 1994).

Overhead wires can effectively deter bird use of specific areas where they are causing a nuisance (Gorenzel et al 1994). The birds apparently fear colliding with the wires and thus avoid flying into areas where the method has been employed. Overhead wires may be used to prevent vultures from loafing on the peaks of steep-roofed homes.

Porcupine wire (e.g., Nixalite™, Catclaw™) is a mechanical repellent method that can be used to exclude birds from ledges and other roosting surfaces (Williams and Corrigan 1994). The sharp points inflict temporary discomfort on the birds as they try to land which deters them from roosting. Drawbacks of this method that it can be expensive to implement if large areas are involved. Coil wire, which resembles a slinky toy, can be used on ledges as a mechanical repellent. Electric shock bird control systems are available from commercial sources and, although expensive, can be effective in deterring pigeons and other birds from roosting on ledges, window sills and other similar portions of structures (Williams and Corrigan 1994). Electrical shock bird control systems similar to those placed on window ledges can be placed on the peaks of roofs of homes to deter vultures from loafing (Bird Barrier America 1999)

Auditory scaring devices such as propane exploders, pyrotechnics, electronic guards, scare crows, shooting in the air, and audio distress/predator vocalizations are effective in many situations for dispersing damage-causing bird species. These devices are sometimes effective but usually only for a short period of time before birds become accustomed and learn to ignore them (Schmidt and Johnson 1984, Bomford 1990, Booth 1994, Rossbach 1975, Mott 1985, Shirota and Masake 1983, and Arhart 1972). Birds, too, quickly learn to ignore scaring devices if the birds' fear of the methods is not reinforced with other tactics.

Visual scaring techniques such as use of mylar tape (highly reflective surface produces flashes of light that startles birds), eye-spot balloons (the large eyes supposedly give birds a visual cue that a large predator is present), flags, effigies, sometimes are effective in reducing bird damage. Mylar tape has produced mixed results in its effectiveness to frighten birds (Dolbeer et.al. 1986, and Tobin et.al. 1988). Birds quickly learn to ignore visual and other scaring devices if the birds' fear of the methods is not reinforced with other tactics.

Effigies can be used to disperse vulture roosts and protect property (Avery et al. 2002, Tillman et al. 2002). Effigies can be dead vultures, taxidermy vultures, or modified plastic goose decoys painted to resemble vultures (Humphrey et al. 2001, Avery et al. 2002, Tillman et al. 2002). Effigies are hung upside down as high as possible in roost trees or from specially constructed masts to disperse vultures (Humphrey et al. 2001, Tillman et al. 2002). A migratory bird permit is required from the FWS before a vulture may be taken to use as an effigy or to salvage a dead vulture (e.g., road kill) to use as an effigy.

Lasers are non-chemical, non-lethal technique recently evaluated by the National Wildlife Research Center to disperse double-crested cormorant roosts (Glahn et al. 2000). For best results and to disperse numerous birds from a roost, the laser is most effectively used in periods of low light, such as after sunset and before sunrise. In the daytime, the laser can also be used during overcast conditions or in shaded areas to move individuals and small

numbers of birds, although the effective range of the laser is much diminished. Moving the laser light through the tree branches rather than touching birds with the laser light elicited an avoidance response from cormorants (Glahn et al. 2000). During pen trials with lasers, the cormorants were inconsistent in their response with some birds showing no response to the laser (Glahn et al. 2000). The lack of overt response by cormorants to lasers is not clearly understood, but suggests laser light is not an highly aversive agent (Glahn et al. 2000). Blackwell et al. (2002) tested lasers on several bird species and observed varied results among species. Lasers were ineffective at dispersing starlings and cowbirds (Blackwell et al. (2002)). Lasers were initially effective at dispersing pigeons and mallard ducks but the birds habituated in approximately 5-minutes and 20-minutes, respectively (Blackwell et al. (2002)). Canada geese reacted to the laser displaying neophobic avoidance to the approaching laser beam.

Vultures response to lasers is still being evaluated. In Florida, a roost of over 250 vultures in a residential neighborhood was dispersed after a laser was used there during 4 consecutive evenings. No habituation to the laser was noted. However, the birds returned 2 days later after laser harassment had ceased (M. Avery, NWRC, pers. commun.). At three other roosts, similar short-term response were observed. In Virginia, lasers have been used with other non-lethal and lethal methods as part of an integrated roost dispersal program in 2002. While the laser did disperse the vultures initially, some vultures habituated to the laser and eventually stopped responding (C. Fox and D. Blixt, WS, pers. commun.). It appears that lasers can provide some short-term vulture control, but there long-term effectiveness remains to be determined. As with other tools, lasers are best viewed as components of an integrated management effort.

Live traps include:

Live/Decoy traps are used by WS for preventive and corrective damage management. Decoy traps are similar in design to the Australian Crow Trap as reported by Johnson and Glahn (1994) and McCracken (1972). Live traps are designed as a large rectangular pen with an open funnel placed at one end where vultures enter the trap. Carrion or other food (fish parts) should be placed within the trap or just outside the funnel entrance. After the first few vultures are captured they act as decoy birds. Perches are configured in the trap to allow birds to roost above the ground and in a more natural position. Feeding behavior and calls of the decoy birds attract other birds which enter and become trapped themselves. Active traps are monitored daily, every other day, or as appropriate, to remove and euthanize or release trapped birds and to replenish bait and water. Decoy traps and other cage/live traps, as applied and used by WS, pose no danger to pets or the public and if a pet is accidentally captured in such traps, it can be released unharmed.

Modified foothold traps are used by WS for corrective damage management in urban/suburban areas where vultures are damaging buildings and nonlethal methods have moved the vultures from one building to another. The traps have padded jaws and weaker springs than similar sized number 3 traps. The traps are usually set in gravel or rock ballast on roofs around a large meat bait or carcass anchored to the roof of the building used by the vultures. The traps are anchored to railroad tie plates or another heavy object. Captured vultures are humanely euthanized.

Rocket or cannon nets are used by WS for preventative and corrective damage management. Rocket and cannon nets are projectile-type net traps comprised of 3 - 5 rockets or cannons and a large net (e.g., 33 x 57 foot with 2-inch square nylon mesh) (Dill and Thornberry 1950, Cox and Afton 1994, Eriksen et al. undated). The net is folded upon itself or set inside a net box (Eriksen et al. undated). The rear of the net is anchored to 5 or 10 pound boat anchors or tied with inner tubes to stakes driven into the ground. The net is folded up upon itself. Bait is placed approximately 15 feet in front of the net. The rockets or projectiles in the cannons are propelled by a smokeless powder charge or black powder charge which are ignited with an electric squib inside the charge. The charges are placed inside the rockets or cannon tubes and tested with a galvanometer for electrical continuity. A spool of at least 200 - 350 feet of 18 or larger

gauge wire is unspooled and connected at one end to the charges and at the other end to a blasting machine. When an adequate number of birds are in front of the net, usually less than 25 feet away, the blasting machine is charged and fired. Firing the blasting machine sends an electrical charge down the wire and ignites the charges in the rockets or cannon tubes which discharges the net from the folded position. Birds are caught alive with rare instance of a bird being killed or injured. Captured vultures may be humanely euthanized or released. WS personnel receive training before using rocket or cannon nets.

NONLETHAL METHODS - CHEMICAL

Tactile repellents. A number of tactile repellent products are on the market which reportedly deter birds from roosting on certain structural surfaces by presenting a tacky or sticky surface that the birds avoid. However, experimental data in support of this claim are sparse (Mason and Clark 1992). The repellancy of tractile products is generally short-lived because of dust, and they sometimes cause aesthetic problems and expensive clean-up costs by running down the sides of buildings in hot weather.

LETHAL METHODS - MECHANICAL

Shooting is more effective as a dispersal technique than as a way to reduce bird densities when large number of birds are present. Normally shooting is conducted with shotguns or rifles. It may be conducted with .22 or .25 caliber air rifles. Shooting is a very individual specific method and is normally used to remove a single offending bird. However, at times, a few birds could be shot from a flock to make the remainder of the birds more wary and to help reinforce nonlethal methods. Removal of a few vultures from a local population increases the efficacy of harassment programs and prevents habituation to harassment (Kadlec 1968). Shooting can be relatively expensive because of the staff hours sometimes required (USDA 1997). Shooting with shotguns, or rim and center fire rifles is sometimes used to manage bird damage problems when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible. All firearm safety precautions are followed by WS when conducting VDM activities and all laws and regulations governing the lawful use of firearms are strictly complied with.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Cervical dislocation is sometimes used to euthanize birds which are captured in live traps. The bird is stretched and the neck is hyperextended and dorsally twisted to separate the first cervical vertebrae from the skull. The AVMA approves this technique as humane method of euthanasia and states that cervical dislocation when properly executed is a humane technique for euthanasia of poultry and other small birds (Beaver et al. 2001). Cervical dislocation is a technique that may induce rapid unconsciousness, does not chemically contaminate tissue, and is rapidly accomplished (Beaver et al. 2001).

LETHAL METHODS - CHEMICAL

CO₂ is sometimes used to euthanize birds which are captured in live traps. Live birds are placed in a container such as a plastic 5-gallon bucket or chamber and sealed shut. CO₂ gas is released into the bucket or chamber and birds quickly die after inhaling the gas. This method is approved as a euthanizing agent by the American Veterinary Medical Association (Beaver et al. 2001). CO₂ gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is used to carbonate beverages for human consumption and is also the gas released by dry ice. The use of CO₂ by WS for euthanasia purposes is exceedingly

minor and inconsequential to the amounts used for other purposes by society.